

# AMERICAN ARTISAN

SEPTEMBER  
1940



RESIDENTIAL AIR CONDITIONING  
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED  
1880

# CAPITALIZE

*On Smoke Pipe and  
Elbow Business*

## LAMNECK

**Distributors are Completely  
Stocked to Supply Your  
Needs Instantly**

Replacement business is booming NOW! Complete new heating plants as well as a vastly increased repair business should turn the next few months into the biggest season you've had in years!

Take on every dollar's worth of work that comes your way—make a bigger percent of profit on every job! You don't have to worry about "shop capacity" or skilled men for installing, because the greatest shop in the industry has stocked your nearby LAMNECK Distributor with the Pipe and Elbows, and all the fittings you'll need to handle every job and complete it *on time*—actually ahead of time when you see for yourself how the Lamneck Features speed up your schedule . . . save you hours and days on every installation!

*Specify*

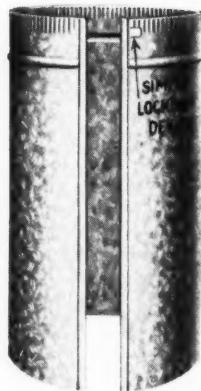
**NOTE OUR  
NEW  
ADDRESS**

# LAMNECK

After you write for the name of your nearby distributor, sit down and talk with him. You can rely on his sound advice and judgment.

**LAMNECK PRODUCTS, INC.**

*Middletown, Ohio*



Lamneck Smoke Pipe instantly assembled . . . permanently locked! Priced for your profit



Lamneck Deep-Swedge, easily-adjusted Elbows assure perfect fit FASTER!

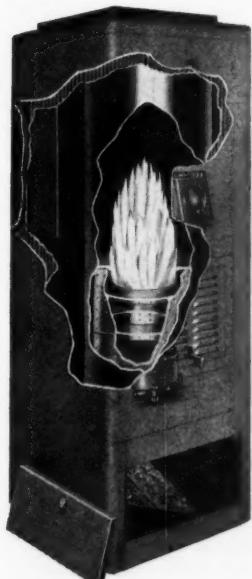


**Prefabricated Duct and Fittings  
for all Types of Residential Warm  
Air Heating and Air Conditioning  
Systems.**

# Only Lochinvar gives you...

• Mr. Dealer: You wanted a small oil-burning winter air-conditioning furnace to sell the small home builder and you wanted it to be the best buy for the small home owner—well, here it is, the new Model 60—that has already won acceptance from hundreds of dealers in all sections of the country.

It is the furnace buy of the year, for it is priced in proportion to the cost of small homes, yet it is constructed and designed to give the same heating satisfaction as the most expensive furnace.

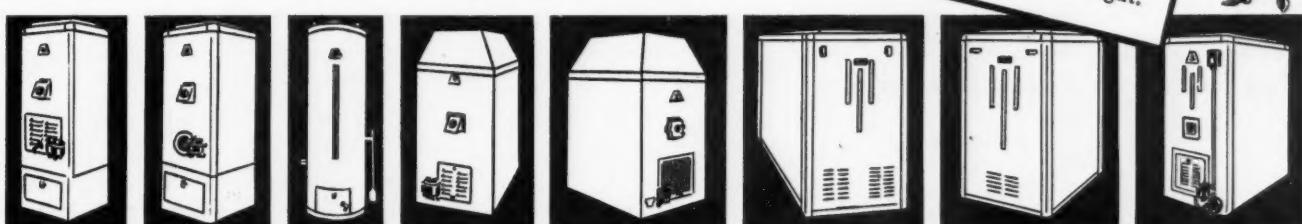
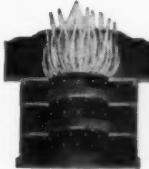


THE NEW MODEL  
60

Yes, "It's what you wanted," to sell the volume low cost home market, so act now to cash in on it—fill in the coupon below and mail it today!

## The Secret of the "60's" Low Cost Operation— The Multiple Stage Burner

This patented burner is your assurance that the Model 60's cost of operation will be low enough to fit any small home owner's budget. It is noiseless in operation (has no moving parts) yet its cleanliness and efficiency are unequaled. You can definitely save money on service calls with this type burner.

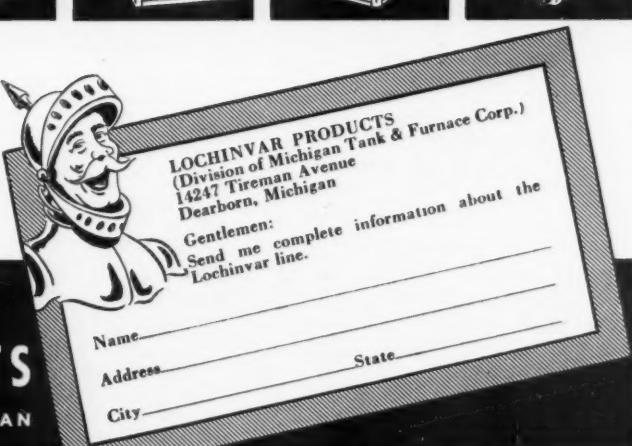


## A Line-Up of Profit Builders

Lochinvar's program of large volume production and low cost selling gives you a complete line of oil-burning furnaces and water heaters that beats all heating competition in the low cost home market.

Each unit Lochinvar manufactures meets the requirements of the small home buyer, in size, price and quality. There is a model designed and engineered to fit each size home and the price of the furnace is really in proportion to the cost of the home. This naturally gives the Lochinvar dealer an opportunity to sell various size homes in the lower price bracket and still handle only one line—the line with the biggest margin of profit for him. (All models listed as standard by Underwriters Laboratories.)

**Lochinvar PRODUCTS**  
14247 TIREMAN AVENUE • DEARBORN, MICHIGAN



# AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES  
SHEET METALS

AND

Warm-Air  
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 109, No. 9

September, 1940

Founded 1880

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## In This Issue

THOSE who manage our shops—especially those entrusted with "getting business" will undoubtedly be interested in this month's Washington Letter in which Arnold Kruckman explains where the government's vast building program originates and who signs the order. Page 38. Questions are invited.

The changing tides of requests are always mystifying. For instance, we have received lately numerous questions on church heating. It can't be that so many churches suddenly develop trouble. So we take pleasure in describing—page 42—a church heating system which its owners praise extravagantly. Perhaps the clever zoning has something to do with the enthusiasm. This zoning does two things—saves fuel by heating only the spaces occupied at the moment and permits using the full capacity of furnace and blower in any one zone.

The concluding article in the three-part series on design of cooling systems by E. R. Ross appears on page 56. In the three articles Mr. Ross has detailed the design for a cooling system in a Dress Shop (June); Drug Store (July) and Industrial Offices (this issue). We wanted each article to be a step-by-step explanation of the problems of each type of occupancy. We hope the articles have been useful.

We begin on page 66 a sequence of several articles by Willoughby G. Sheane on problems of Product Finishing. Each article will be complete in itself and during the series most of the common problems of finishing will be discussed. By finishing we mean all types of spray and brush painting, dipping, etc. and by product we mean anything fabricated from sheet metal which must be given an applied coating. Questions and requests are invited as we go along.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago, Ill., U. S. A. Branch Offices—in New York, Room 1734, Grand Central Terminal Building, Murray Hill 9-8293; in Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; in Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191. Copyright 1940 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

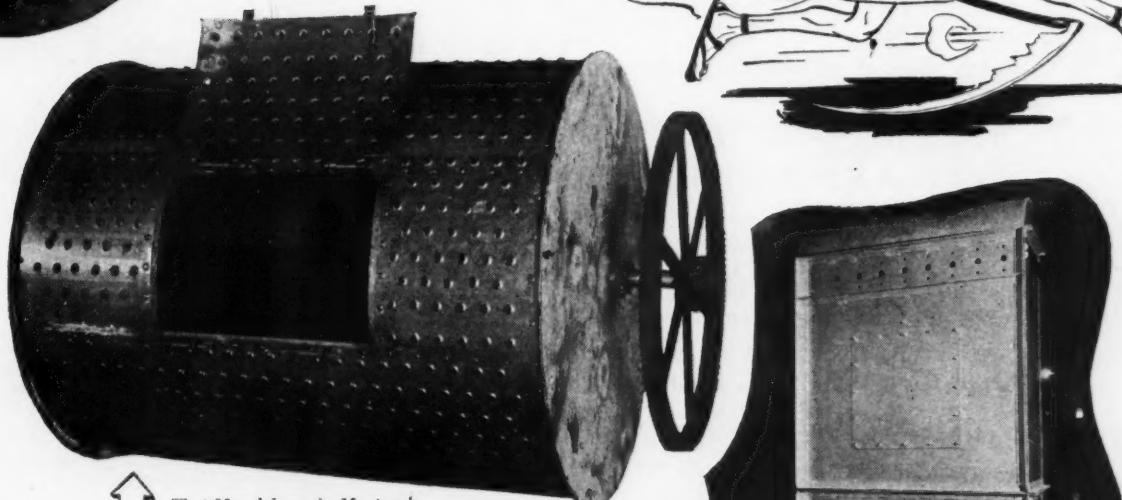
Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, \$2.00; Foreign, \$4.00. Single copies, U. S. and possessions, \$.25. Back numbers, \$.50. January, 1940, Directory issue, \$1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

**More than 8,000 copies of this issue are being distributed**



## These Didn't Age "In The Wool" . . .

BY TIM SHEARS



That Monel drum in Montreal

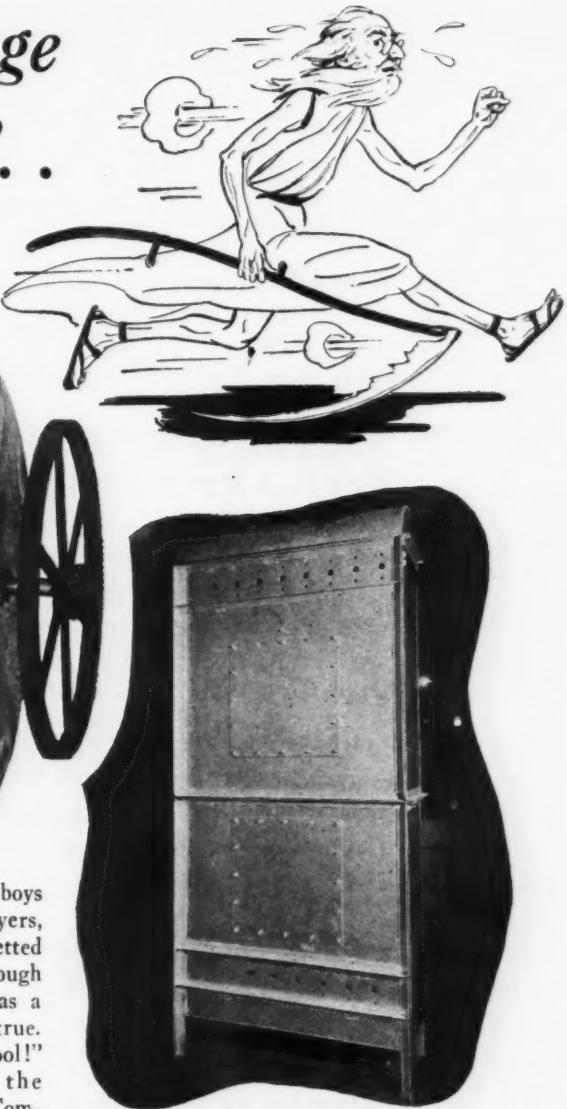
THE boys in the shop swear I wangled that trip to estimate three jobs near Niagara Falls. Of course it was around July first . . . and could I help it if the customer invited me to go fishing with him in Canada over the Fourth? He wanted to check up on some new equipment in a textile plant in Montreal.

Montreal . . . now there's a town where they know how to eat. And they take pride in doing a job of metal work as neat as a French pastry. This mill was working three shifts on army orders and doing a slick job on wool fabrics. They were pleased as punch with a revolving drum (pictured above) that stood up under 3 years tough service. I'd guess it was about 36" in diameter and 54" long. My micrometer thumb estimated it was made from about 14 ga. Monel. Though this drum was perforated with  $\frac{1}{2}$ " holes on 2" centers, it has plenty of strength to spin heavy loads of wet fab-

ric. I tip my kelley to the boys at McGruer, Fortier & Myers, Ltd., who welded and riveted this drum . . . and to the tough Monel that stays bright as a dollar and keeps colors true. Monel never "ages in the wool!"

Over in Cincinnati, the Hauser Stander Tank Company made this 4-compartment beauty for a cotton mill. The tank body is 2" cypress, and it's going to a North Carolina town named Cedar Falls! As you can see from the picture down below that I snapped with my lunch-box-Brownie, this tank is lined, slick as a whistle, with 25 ga. Monel sheets. Those perforated false bottoms, tipped down at the left end, are 16 ga. metal.

When the Boss phoned down for some help on an "age-er" I thought he was making dirty cracks about my gray hair . . .

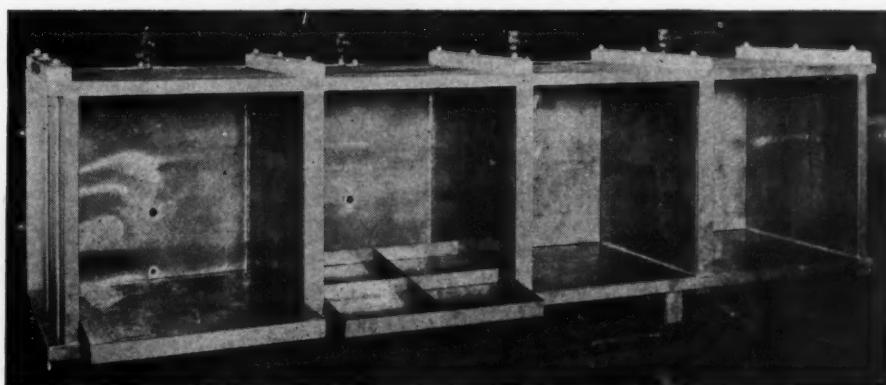


This is the "age-er"  
I told you about

but he was on the level. This ager (pictured above) is a 48" x 16" cabinet, 102" high. It has to stand hot steam used to set colors printed in garment labels. Knowing that Monel isn't phased even by a continuous hot foot from metal-hungry chemicals, Rudman & Scofield, New York, electrically welded this vaporizing cabinet from 18 ga. Monel. The vaporizing pans 18 ga. Monel. It's kinda funny that this ager is made of Monel that stays young. Here's a straight tip: any plant that processes textiles is a likely prospect for equipment made from Monel. Spin those men a yarn about how Monel withstands salt, dyestuffs, soaps . . . and doesn't rust. Tell them how Monel saves money for them by delivering the goods *clean*. Textile plants need equipment now for their busy season and you can sew up extra orders. Monel means money...for you.

TIM SHEARS

THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street      New York, N.Y.



# RYBOLT

## CAST IRON GAS-FIRED Winter Air Conditioner

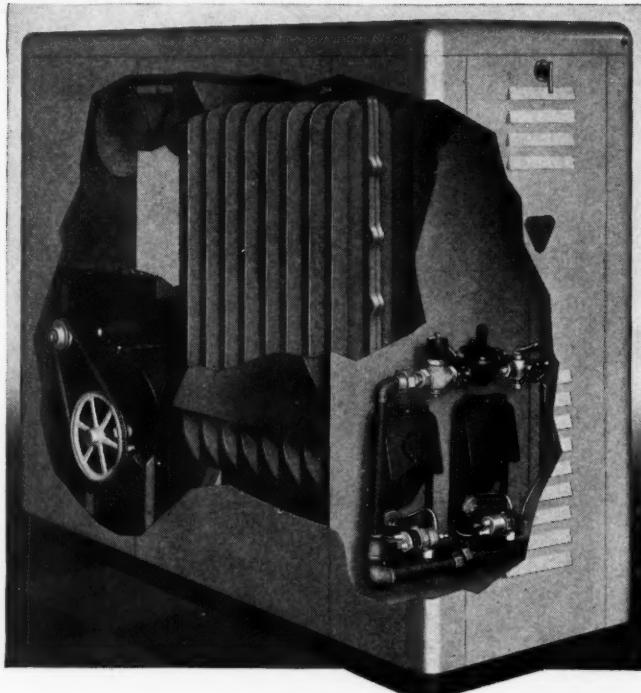
### A NEW HIGH IN GAS HEATING EFFICIENCY AND ECONOMY



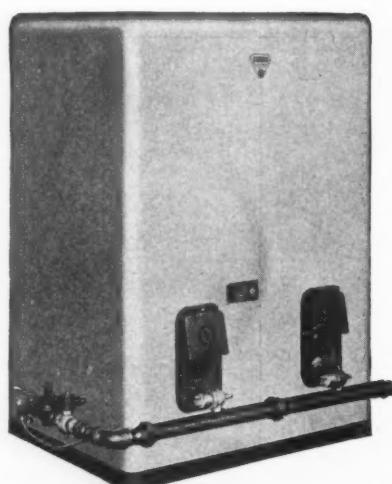
Completely new in design this RYBOLT Cast Iron Gas-Fired unit satisfactorily solves the problem for customers who want the convenience and cleanliness of automatic gas heating without excessive fuel cost.

Important features are the new type combustion chamber and novel flue economizer, both made of durable gray iron castings, which minimize harmful condensation of moisture in the flue gas. The combustion chamber is specially designed to direct the generated heat upward through a series of scientifically baffled passages where it is continuously wiped against the inner surfaces, providing quick heat radiation.

The cast iron flue economizer, with its extensive fins, effectively transfers every bit of available heat to the circulating air chamber. Projecting into the return chamber, the flue economizer serves as a pre-heater, thus saving fuel.



Because of its large volume of iron the heating element holds heat a long time, guarding against rapid temperature changes. Compact in size, neat and dignified in design. Cabinet finished in smooth gray Hammerloid enamel with black base is inner-lined with a sheet metal baffle. Sturdy construction; simple and accessible to service. 5 sizes.



### Cast Iron Gas-Fired Gravity Unit

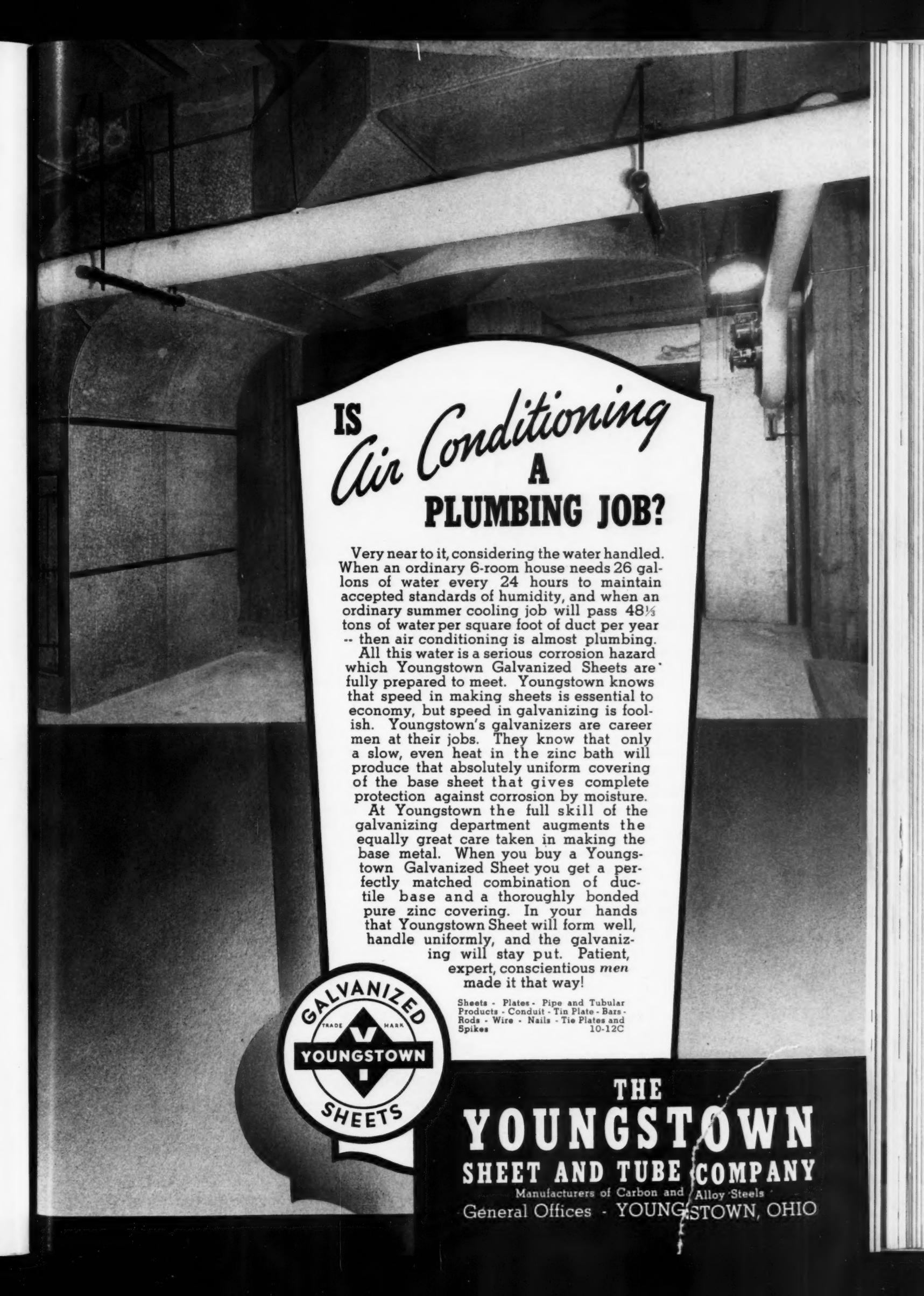
Here is a unit that will capture the business in the low cost housing field. At a very modest outlay it provides the home owner a practical and efficient gas heating unit furnishing the advantages of gas as a fuel with all its convenience, cleanliness and comfort. Fuel bills compare favorably with coal in most localities. Cast iron heating element holds heat and adds durability. Smooth gray Hammerloid finish with black base. 2 sizes.

**WRITE FOR** set of folders covering the complete RYBOLT Line of Warm Air Furnaces and Winter Air Conditioners.

**THE RYBOLT OIL BURNER**  
is furnished in a complete winter air conditioning unit or can be installed in any furnace, giving clean care-free automatic oil heating. Write for folder.



**THE RYBOLT HEATER COMPANY**  
**615 MILLER STREET • ASHLAND, OHIO**



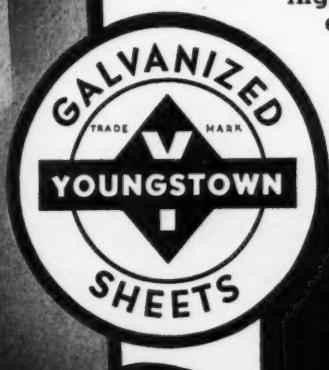
# IS Air Conditioning A PLUMBING JOB?

Very near to it, considering the water handled. When an ordinary 6-room house needs 26 gallons of water every 24 hours to maintain accepted standards of humidity, and when an ordinary summer cooling job will pass 48½ tons of water per square foot of duct per year -- then air conditioning is almost plumbing.

All this water is a serious corrosion hazard which Youngstown Galvanized Sheets are fully prepared to meet. Youngstown knows that speed in making sheets is essential to economy, but speed in galvanizing is foolish. Youngstown's galvanizers are career men at their jobs. They know that only a slow, even heat in the zinc bath will produce that absolutely uniform covering of the base sheet that gives complete protection against corrosion by moisture.

At Youngstown the full skill of the galvanizing department augments the equally great care taken in making the base metal. When you buy a Youngstown Galvanized Sheet you get a perfectly matched combination of ductile base and a thoroughly bonded pure zinc covering. In your hands that Youngstown Sheet will form well, handle uniformly, and the galvanizing will stay put. Patient, expert, conscientious men made it that way!

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes  
10-12C



THE  
**YOUNGSTOWN**  
SHEET AND TUBE COMPANY  
Manufacturers of Carbon and Alloy Steels  
General Offices - YOUNGSTOWN, OHIO

Below—Wound stator before impregnation. Note—workmanship—phase insulation.



At Left—Stator after dehydration—impregnation with Century insulating compound—baked. Prevents chafing of turns from magnetic vibration. Seals crevices.

Below— $\frac{1}{8}$  horsepower split phase streamlined oil burner motor with flange.



## Century Motors Insulation Process

### Assures Long Life in Damp Basements!

● Ordinary motor insulations are no match for the destructive effects of moisture so often found in damp basements and humid tropical climates. Specify Century Motors with Century's exclusive insulation treatment.

Century's exclusive insulation process *resists moisture absorption*—cements coils together—prevents chafing between wires—resists mechanical abrasion—is thin enough to radiate heat.

This has a special value during the hot summer months when the motor "sweats" when idle, and does not have a chance to dry out before it's called upon to start again in the fall. Yet Century Motors provide this extra measure of protection at no extra cost to you or your customers.

This is only one advantage provided by the complete line of Century Motors, offered in a wide range of types and sizes from fractional to 600 horsepower. Because there is a proper Century Motor to meet the operating demands of any installation, you'll find Century Motors give maximum economy and satisfaction because they're engineered to fit the job.

You'll make more friends for your product and your installations, increase your profits, too, with the specified performance of any Century Motor correctly selected and properly applied. The Century Motor Specialist nearest you will gladly give you full particulars. It will pay you to call him in.

#### CENTURY ELECTRIC COMPANY

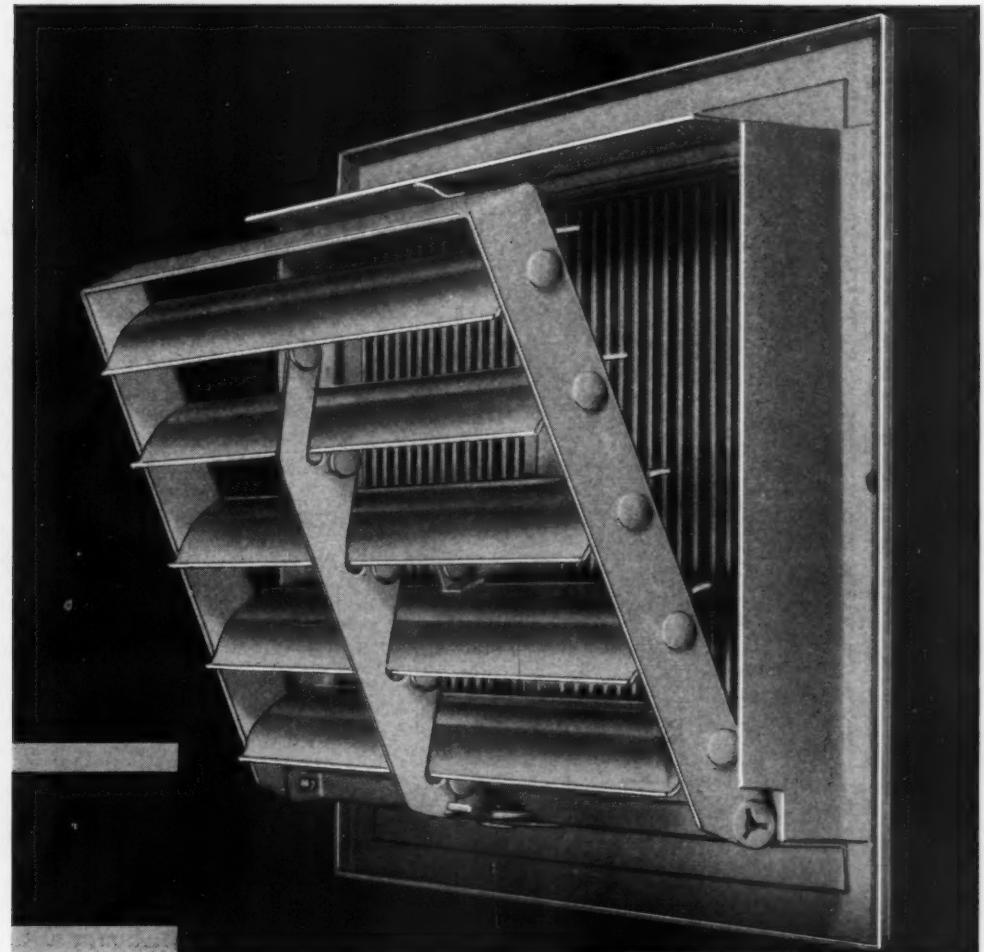
1806 Pine Street St. Louis, Mo.

Offices and stock points in principal cities

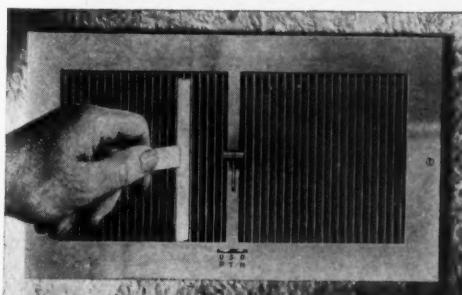


One of the Largest Exclusive Motor Manufacturers in the World

# Inequalled Performance



## A MIGHTY GOOD REASON FOR USING REGISTERS with the **H&C** TURNING BLADE VALVE



The flexible fins in each section of the No. 75 Face are formed from a single piece of steel, and deflection required may be obtained by simply twisting the fins with tool furnished with each unit.



Closed, the turning blade valve is air-tight. To adjust the blades to UP, STRAIGHT or DOWN, requires just a turn of the regulator at the front of the register.

Your customers may know little or nothing about the details of the installation you give them, but they are sure to be plenty critical of the final results, and that's why it's mighty good business to use registers with the H & C TURNING BLADE VALVE!

The reasons for the superior performance of this valve are obvious. It is the only directional flow valve which extends back over the entire duct area, smoothly dividing and turning every bit of the air flow with equal velocity to every portion of the register face. As a result there is far less resistance and turbulence; unrestricted air flow and the assurance of better distribution to the farthest points in the room.

It's results that count! And the results obtainable with registers having the H & C TURNING BLADE VALVE can't be matched in any other way. Yet the H & C No. 75 Design, which incorporates this feature, together with multiple sideway deflection, costs no more than ordinary directional registers. Why not try them on your next job?

**HART & COOLEY MANUFACTURING CO.**  
Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulley  
**FACTORY AND ENGINEERING SALES OFFICE:**  
**HOLLAND MICHIGAN**  
Chicago Office: 61 W. Kinzie St.  Philadelphia Office: 1600 Arch St.

# "WHEN YOU'VE GOTTA HAVE BOILER TUBES

*you've gotta have 'em Quick!"*



"That was fine service," the foreman in charge of the boiler repair job told us, "for when you've gotta have boiler tubes you've gotta have 'em quick."

He referred to the order received by our St. Paul warehouse at 4:50 P. M. (our closing time 4:30). Shipment was made that night and delivered in Sioux Falls, South Dakota, the following morning.

THAT is a typical example of how Scully Service operates in handling an emergency order. Regular orders get the same prompt attention. Each of the eight Scully warehouses operates on the basis that our customers always want quick, friendly service, no matter how large or small the order may be.

When you need boiler tubes—call Scully. And call us for whatever you need in steel, steel products, copper and brass. Huge stocks make immediate shipment possible. Wire, phone or write the warehouse nearest you. And if you don't have the handy Scully Stock List and Reference Book, ask for a copy. It's free.

## SCULLY STEEL PRODUCTS COMPANY

*Distributors of Steel, Steel Products, Copper and Brass*

Warehouses at CHICAGO • NEWARK, N. J. • ST. LOUIS • BOSTON  
ST. PAUL-MINNEAPOLIS • CLEVELAND • PITTSBURGH • BALTIMORE

When you need boiler tubes ...

*Call Scully*



# UNITED STATES STEEL



# Q-U-I-E-T





**FLANGE PILLOW  
BLOCK**

Constructed with ample leeway for the most severe side mount requirements, the Flange Pillow Block is always completely dependable.



**ONE-PIECE STEEL HOUSING PILLOW  
BLOCK**

This is the largest production item in the Random line because of its great popularity. Mounts in any position, less in cost.



#### **UNIVERSAL PILLOW BLOCK**

Operates in any position under severest conditions. The Universal has a record of unsurpassed service and is the last word in pillow block construction.

**On point!** The pedigreed hunting dog freezes on a covey of quail without a breath of sound.

In air conditioning, just as in upland game shooting performance *must* be quiet. You are assured of complete freedom from metallic bearing noises if the blowers in your installations are equipped with Randall Pillow Blocks.

Put an end to bearing troubles easily and at low cost by specifying Randall precision performance for your equipment. Randalls are long lived, self-lubricating and constant self-aligning and assure added years of quiet and trouble-free service in the field with only minimum attention.

OVER A MILLION Randall Pillow Blocks are operating satisfactorily in almost every kind of equipment. Behind each is the record of over a third of a century of bearing engineering. Such a background explains why Randall bearings have been selected as standard by most air conditioning equipment manufacturers.

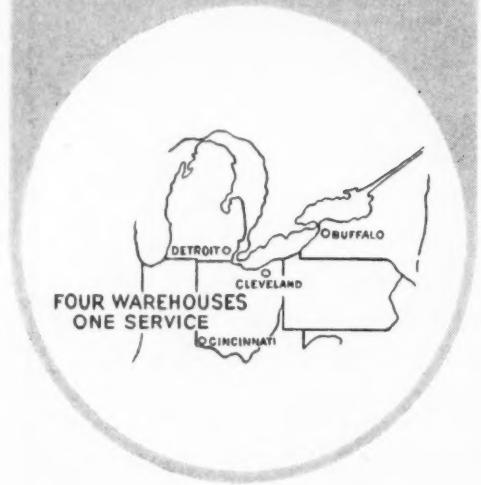
**Write today for No. 40 catalog showing  
the complete Randall line.**

### *Representatives Carrying Stocks*

**Representatives Carrying Stocks**

C. W. Marwedel San Francisco, Cal.	Salt Lake Hardware Co. Salt Lake City, Utah
Tek Bearing Co. 172 Lafayette, New York City	

# NOW OSBORN SERVICE for CINCINNATI

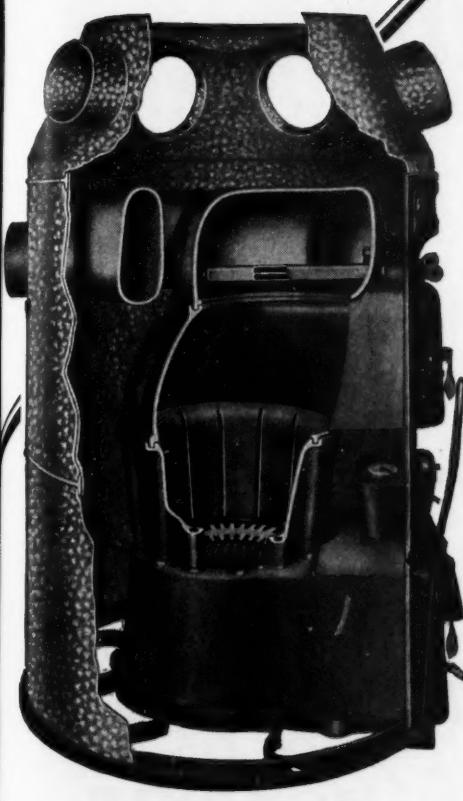


A DEPENDABLE SOURCE  
OF SUPPLY FOR 81 YEARS

We are pleased to announce the purchase of the assets and good will of the Moise Steel Company of Cincinnati—an old and respected name throughout the sheet metal trade of southern Ohio.

Operating under the same personnel and from the present central location at 3240 Spring Grove Avenue where new stocks of Osborn products have been added, the new Cincinnati division of The J. M. & L. A. Osborn Co. is now ready to serve you. Products of our Cleveland warehouse—one of the country's largest—are also available for prompt, overnight delivery.

THE J. M. & L. A.  
**OSBORN CO.**  
CLEVELAND, OHIO  
BUFFALO • CINCINNATI • DETROIT  
Manufacturers—Distributors of Metals and Metal Products



# GET OUT IN FRONT... SELL GRAVITY HEAT!

**G**RAVITY heat is now, as in the past, the backbone of the Warm Air Furnace heating field. More new homes are equipped with modern gravity furnaces than any other type of heat and when replacement jobs are sold, more gravity units are installed than any other.

Top performer among gravity heating plants is the WISE Series "A." Quality, efficiency and economy are built right into this superior unit from the very start, assuring the homeowner clean, healthful heat and the contractor a tight, profitable installation.

Check over the following features and prove to yourself that the WISE Series "A" Gravity Furnace will help you get out in front of your competitors for the lion's

share of gravity heating profits. New one-piece, self-cleaning radiator that provides a larger combustion chamber and more prime heating surface . . . and which WILL NOT fill up with soot and dirt . . . the new ashpit and lower front, all in one piece to eliminate joints, and make installations easier . . . the one-piece cellular firepot, proved by university tests to be AT LEAST nine per cent more efficient than the solid type . . . the permanent domestic hot water supply (available at slight extra cost) . . . the one-piece square base and enameled square casing for air conditioning use all make it outstanding among other warm air heating plants.

Protect the customer and the job by specifying and installing a Series "A" Wise Furnace on all your gravity heating jobs.

WISE SERIES "A"  
GRAVITY FURNACE

*Write Today  
for  
Literature*

---

## ... round out your line with the WISE Air Conditioning Unit

You'll also have occasion many times this fall to bid on an air conditioning job . . . and when you do, you'll want to be sure you have the best possible unit behind you to assure perfect performance. The answer is the "A" Series WISE Air Conditioning Unit pictured at left. Attractively finished and modernly styled it will fit right in

with your customers' decorated basements. Substantial construction too, strong enough to stand the toughest winters with a minimum of fuel and a maximum of satisfaction.

Investigate the Wise proposition. Literature on the complete line will be gladly sent on request. Write us today!

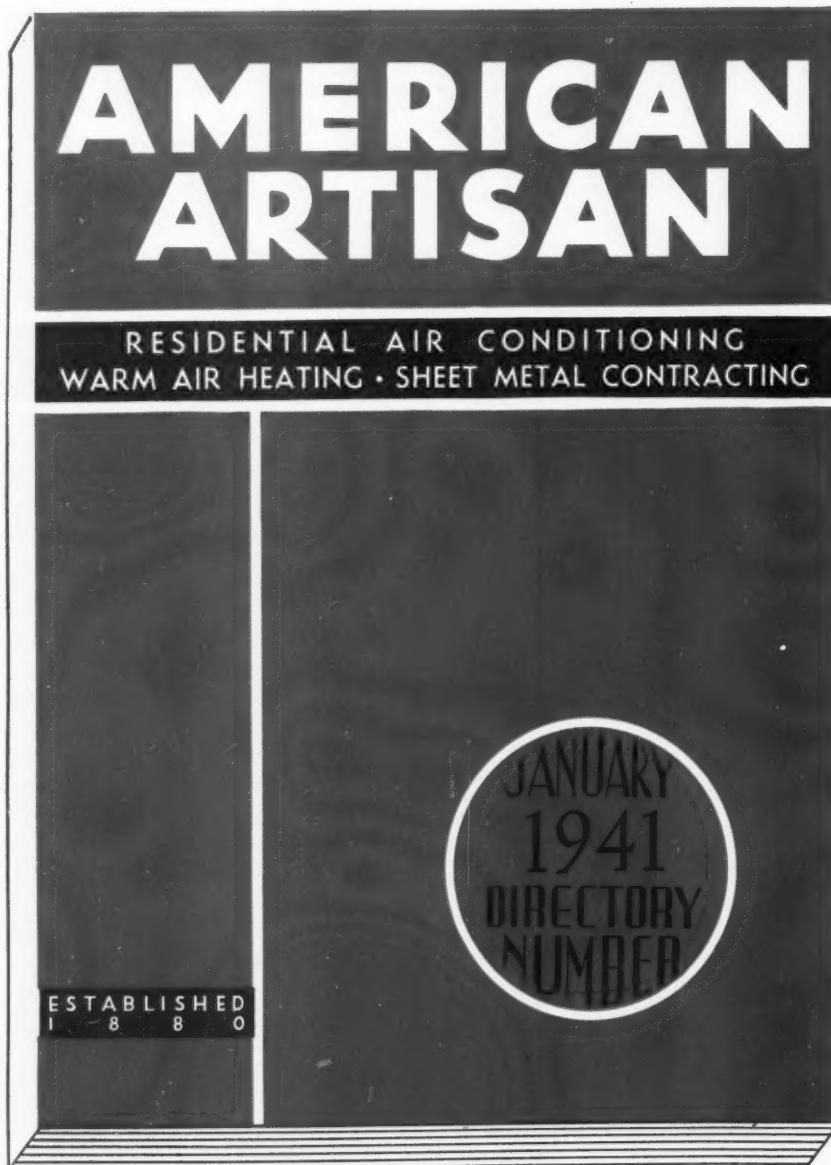


WISE AIR CONDITIONING UNIT

---

**WISE FURNACE CO.**  
AKRON OHIO

... it's on the way!



← ... truly  
*the BUY*  
← *of the year*

MANUFACTURERS →

More residential air conditioning, warm air heating and sheet metal work will be done, and more equipment needed, in the coming year than in any other year for quite some time . . . and this year, as in the past, buyers will rely on AMERICAN ARTISAN'S complete and correct Directory Section to help them select their product and equipment requirements. This issue is the place to show your ENTIRE LINE. The Directory is used as a year 'round reference and your advertisement will receive maximum attention through our system of prominently "dotting" every advertiser's listings to guide buyers and specifiers to your pages.

Better drop us a note today enclosing your reservation for liberal space to enable you to show your entire line . . . use plenty of color and bleed also, to make your ad REALLY stand out!

CLOSING DATE FOR COLOR FORMS IS DECEMBER 15TH. FOR BLACK AND WHITE FORMS, THE 24TH. Contact your agency today . . . or send us your material and we'll prepare the ad for you . . . no charge, of course.

Send Us Your Space  
Reservation Today!

AMERICAN ARTISAN  
6 North Michigan Avenue

Chicago, Ill.

# AMERICAN ARTISAN'S 9th Annual DIRECTORY NUMBER



**O**NCE more . . . this time for the ninth successive year . . . AMERICAN ARTISAN presents to the trade the COMPLETE, ORIGINAL, AUTHORITATIVE Directory of Residential Air Conditioning, Warm Air Heating and Sheet Metal Equipment . . . as part of the January 1941 Issue.

This Directory for years has been accepted as the real source of accurate, concise information on "who makes it" and where they are located. The January 1941 Number is now in the process of preparation. The

Directory is being completely revised to include all the new products and new sources of supply which have appeared since the last issue. Every manufacturer's line is being checked and re-checked to make sure that he is properly listed under every product he makes, with all his trade names and his correct address.

You'll find this coming Directory issue to be probably the largest and most complete of any to date. Further information on request . . . just drop us a line.

## ★ DIRECTORY SECTION

- 1 **PRODUCTS CLASSIFIED** Here will be listed in alphabetical order, with thorough cross-indexing, all products used in residential air conditioning, warm air heating and sheet metal work. Under each product, and also in alphabetical order, will be given the name of every manufacturer of that product.
- 2 **TRADE NAME SECTION** Hundreds of products are sold under trade names and many buyers and specifiers know them only by those names. Hence, all trade names which differ from those of the firms using them are listed here, together with the products they designate and their manufacturers.
- 3 **MANUFACTURERS ADDRESSES** In this section, again in alphabetical order will be given the full name and address of every manufacturer whose products and trade names are listed in the other two sections.

## ★ EDITORIAL

No regular editorial space will be sacrificed for the sake of the Directory Section in this January Issue. Our editors are as usual selecting a group of outstanding and permanently valuable articles on residential air conditioning, warm air heating and sheet metal contracting subjects that will make this Directory number as much a reference book from an article standpoint as it will from that of product specification and purchase.

... and **NO EXTRA COST** - - - -

The rates are the same as for any other issue.

*Closing Date . . . December 15th*

# AT LAST!

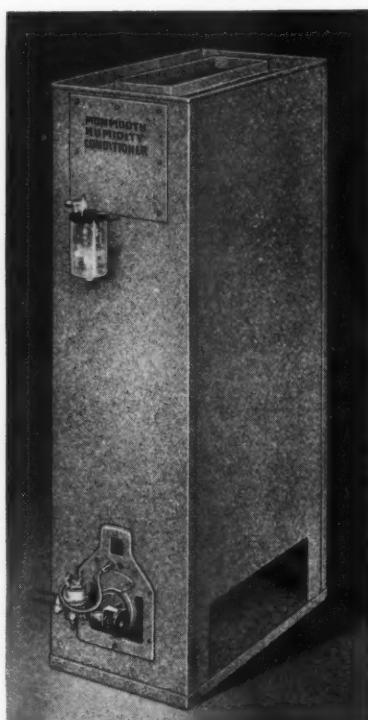
## AN AIR HUMIDITY CONDITIONER FOR RADIATOR HEATED SPACE

(Gas Operated)

Now! The air in radiator heated homes can be health conditioned.

Every radiator heated home a prospective customer for you.

Automatically graduates room humidity to fit existing weather.



Just what you have been looking for and need.

Operates independently of the heating plant.

Fulfils a large existing demand.

Now—it's your turn to cash in.

### THE FIRST PRACTICAL SOLUTION OF THIS PROBLEM

Highest grade design, construction and materials for efficiency, safety, economy, durability, and smooth trouble free operation.

Crackle finish steel cabinet is 10" wide, 17" deep, 36" high. 3" vent,  $\frac{3}{8}$ " gas line, 55 lbs.

Installed in basement delivering moderately warmed, highly humidified air through easily installed standard 4" x 12" ducts and registers. 4" x 12" return. Natural circulation.

Vapor immediately spreads to all except closed rooms by law of diffusion, independently of air circulation.

Consumes only 420 cu. ft. natural, 900 cu. ft. manufactured gas PER MONTH for each humidified average size room. Reduces heating costs.

Drop a line today for complete information.

**MONMOUTH PRODUCTS CO.**  
1933 E. 61st STREET CLEVELAND, OHIO

# MONMOUTH

*The Greatest Name in Humidification*



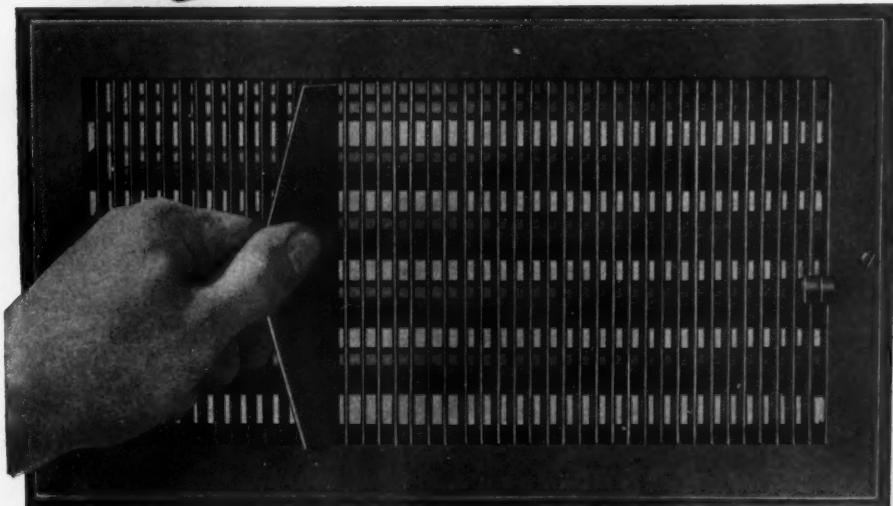
# LEADS the BIG PUSH

## AIR-CONDITIONING REGISTERS...

### ... That Excel

### GRAVITY REGISTERS...

### ... That Harmonize and Delight



FOUR-WAY FLOW FLEX-BAR LINE—Low Cost and definitely Answers all Problems of AIR-DISTRIBUTION.

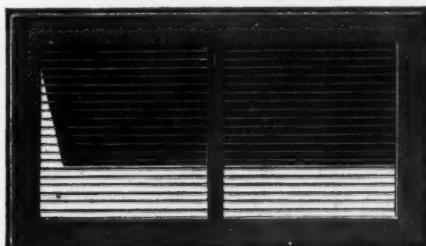
STYLE 256—Sidewall Type. STYLES 267 and 272—Baseboard Types.

Grille-Bars are Bendable to any Desired Adjustment.

A GUARANTEED PERFECT REGISTER. Write for New Revised List Prices.

### CLASS AND PRICE FOR THE MORE COMPETITIVE JOBS

U. S. LOUVER-TYPE A-C REGISTERS



U. S. Louver-Type A-C Registers are made in ALL STYLES for Base and Sidewall Locations. Lower Cost with Non-Vision and Directional Air-Flow Features.

STYLE 103-N PERFORATED A-C REGISTERS



A Line for the Low-Priced Air-Conditioning Job—HAS NO Quality Rival at the Price Offered.

### ... AND DON'T FORGET OUR GRAVITY LINES ...



PANAMA

#### TRUSSTEEL

The snug fitting U. S. Trussteel Register with heel-proof spacing and natural photographic wood grain finish sets a new high standard of craftsmanship.

#### EMBOSSED

The U. S. Steel Embossed Register—"world's strongest"—is favored everywhere for jobs demanding a really serviceable register or smooth appearance and adequate capacities.



COLD AIR FACES TO MATCH



NATIONAL



# UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.



## In Production!

The wheels are turning! The presses are "crunching" out the parts—and "day by day" we are getting closer and closer to complete-line production.

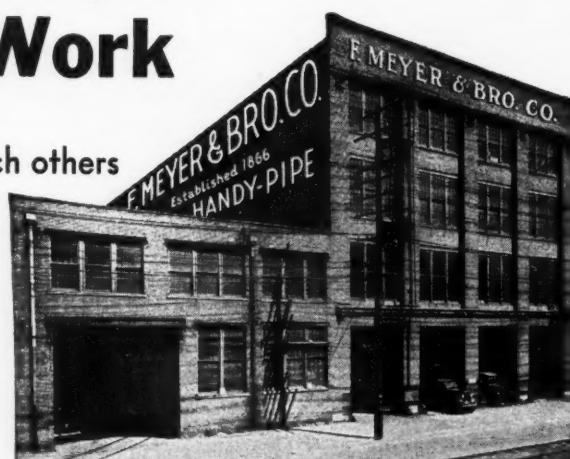
The above picture shows the action in only a part of one floor in our new home—outside view is shown below—a home in which we fully expect to attain new heights in the production of

## Handy Pipe & Duct Work

Handy Pipe continues to be the standard by which others are measured. It helps toward greater profits.

And our duct work is daily winning converts away from the "I'll-Make-It-Myself" school.

**F. Meyer & Bro. Co., Peoria, Ill.**





**Over 50,000 old furnaces go to the junk heap this year!**

# NORGE FASTEMP FURNACES

**give you exclusive selling features that are years ahead of what you've seen!**

Cash in on this huge replacement market with Norge Fastemp Furnace units—revolutionary new quality units at sensationaly low prices based on modern mass production.

**4 Complete Package units cover 90% of all your jobs**

3 of these units cover 65% of your jobs AT PRICES THE SAME AS HAND-FIRED UNITS—one model priced about the same as a good "room heater"!

#### PERFORMANCE UNSURPASSED

—really great economy with abundant heat output. Perfect heat control. Safe to leave—cannot overheat.

#### DRAMATIC ADVERTISING

—colorful booklets; lively newspaper mats to reach your prospects through your local paper.

**MODEL 120 WINTER AIR CONDITIONER:** 120,000 B.T.U. at bonnet, low cost, basement or ground floor installation, oil or gas.

**MODEL OA-63 FASTEMP FURNACE:** 63,000 B.T.U., oil-burning, ground floor, pit or basement installation. 800 C.F.M. forced air. Wall control.

**MODEL OB-60 FASTEMP FURNACE:** 60,000 B.T.U., oil-burning, gravity, basement or pit installation.

**MODEL OC-60 FASTEMP FURNACE:** 60,000 B.T.U., oil-burning, gravity floor furnace, needs only 40" pit under floor.

*Never before have so many original, exclusive and important features been offered in one line of heating equipment. Wire or write for literature and prices—and a great profit opportunity.*

**NORGE HEATING and CONDITIONING DIVISION  
BORG-WARNER CORPORATION, DETROIT, MICHIGAN**

**Send the Coupon**

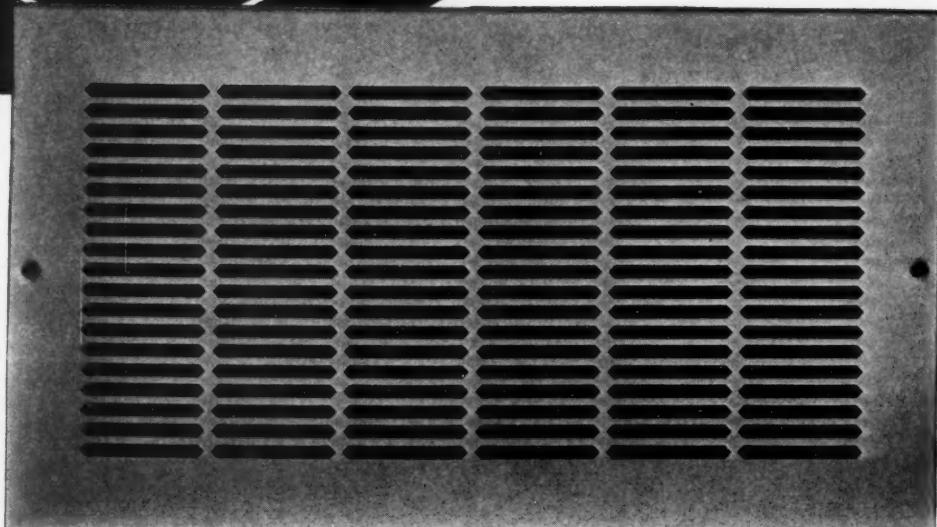
Model OC-60 Fastemp Furnace



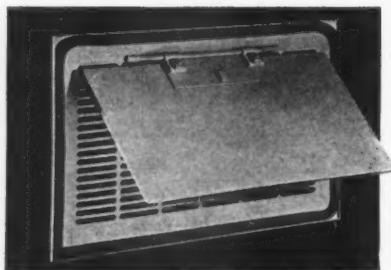
Date _____	Name _____
Norge Heating and Conditioning Division Borg-Warner Corporation 670 East Woodbridge St. Detroit, Michigan	Address _____
RUSH me information about your line of heating equipment.	City _____
State _____	AA-117



**R-600**  
*Series*



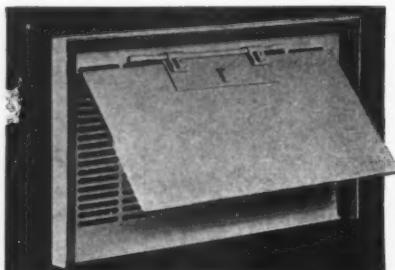
## WATERLOO'S NEW **LOW COST HIGH QUALITY** **REGISTERS**



*Rear View R-600  
Wall Register*



Here's the new big-value register for dealers who want to get a larger share of the profits in the big low cost housing field. R-600 Registers are smart in appearance, making them especially desirable for high wall installations. They are offered in a wide variety of finishes to meet every need. Supply registers, including baseboard type, are furnished with sponge rubber gaskets. Cadmium plated, counter-sunk screws for attaching to wood or metal are supplied with all registers. Appearance—performance—price! You can offer all three in Waterloo R-600 Registers. Write today for full details.



*Rear View R-605  
Baseboard Register*

**WATERLOO REGISTER COMPANY**  
**WATERLOO, IOWA**

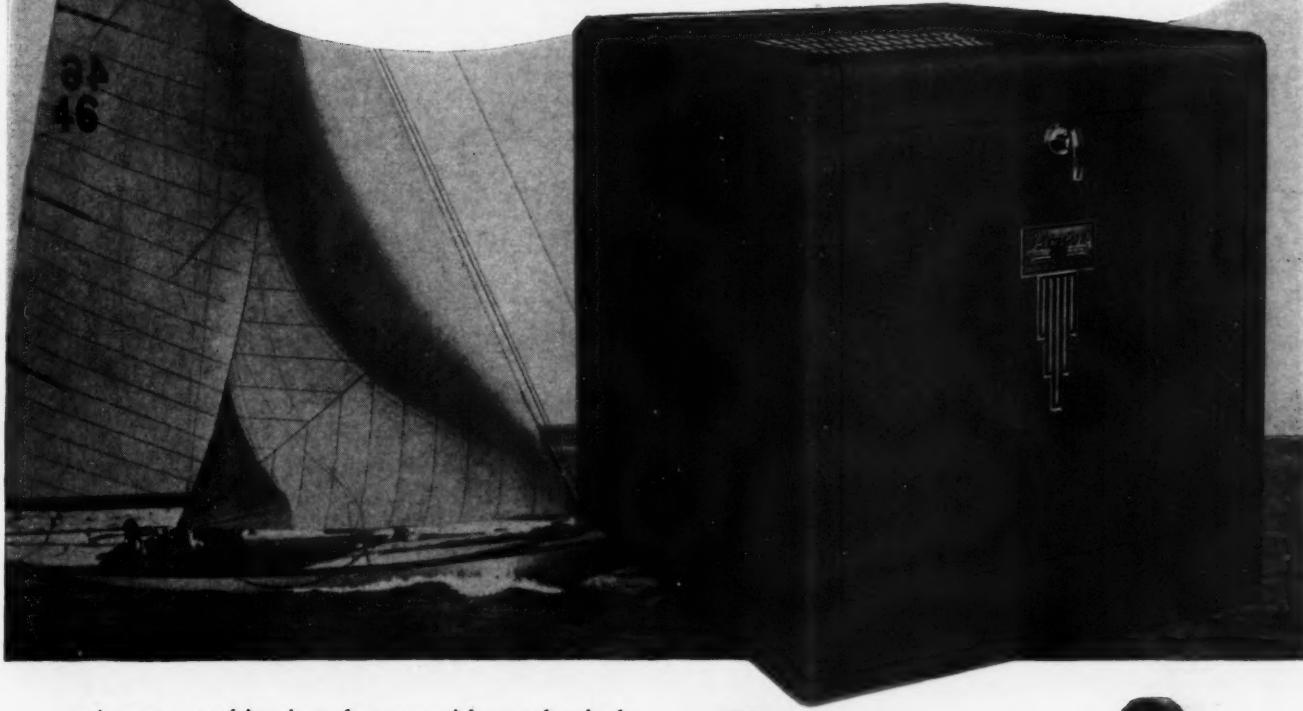
**SEATTLE, WASH.**

*Representatives in all Principal Cities*

# A THING OF BEAUTY —A REAL PERFORMER

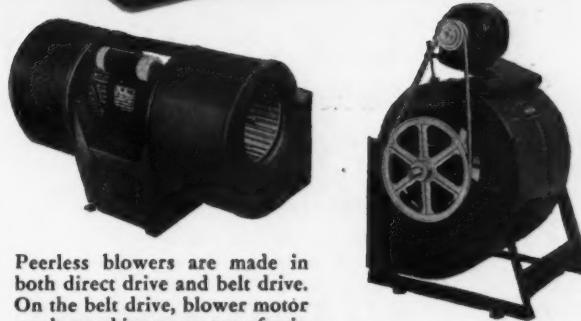
## Peerless<sup>®</sup> BLOWERS

DIRECT DRIVE OR BELT



• A rare combination, beauty with mechanical brains. Only in Peerless Blowers will you find such good looks plus so many exclusive features, each and every one tremendously important in the performance of the unit. Mechanically they have no equal—in looks they have color, style, shape and beautiful lines.

Peerless are the only blowers on the market which are engineered and built almost in their entirety under one roof. For 47 years Peerless has been recognized as leader in the motor and fan industry, consequently they have the background that no other blower manufacturer can claim. Experience and pioneering is what counts and Peerless in blowers, as in motors and fans are the outstanding manufacturers in the business.



Peerless blowers are made in both direct drive and belt drive. On the belt drive, blower motor can be used in rear or top of unit. Fits any style furnace—oil, gas or coal and are easily installed.

Mail coupon for free literature  
on Peerless blowers...the talk  
of the industry.

THE PEERLESS ELECTRIC CO.  
WARREN, OHIO

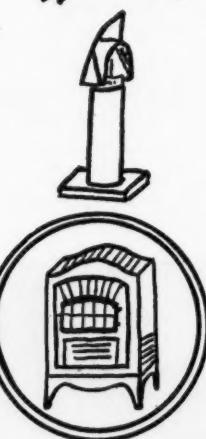
PEERLESS ELECTRIC CO. • WARREN, OHIO	
Please send complete details on your	
Direct and Belt Drive Blowers . . .	
Name	<hr/>
Address	<hr/>
Town	<hr/>
State	<hr/>

# *Every Repair Part Imaginable*



Now is the time to go after that highly lucrative repair business . . . and it will be even more profitable if you are working with **Northwestern's** tremendous line of repair parts to back you up. It assures you of being certain that each and every part that you may need for boiler, furnace or stove will be supplied quickly, and that it will fit perfectly. **Northwestern Repair Parts** will make jobs move faster, and faster moving jobs mean less labor and less cost...and the high quality of every piece will assure long life and gain you many additional satisfied customers.

Line up with **Northwestern** for this season's repair business . . . write today for catalogue of parts. You will find it complete and indispensable.



## **NORTHWESTERN STOVE REPAIR CO.**

Manufacturers of Stove, Furnace and Boiler Repairs

662 WEST ROOSEVELT ROAD, CHICAGO, ILL.



# 10 YEARS AHEAD

## THEN AND NOW

### 10 OUTSTANDING ADVANTAGES

1. Quiet AC Solenoids
2. Two-wire current failure principle
3. Design to eliminate magnetic sticking
4. Rotatable conduit connection
5. Interchangeable coils
6. Bonnet construction for accessibility
7. Minimum number of working parts
8. Reduced current consumption
9. Impact action stainless steel plunger
10. Widest range in sizes,  $\frac{3}{8}$ " to 6"

1931

1941

GENERAL CONTROLS TYPE K-3B MAGNETIC GAS VALVE THEN AND NOW

## LOOK AT THE RECORD OF THE PIONEER AND LEADER IN THE MANUFACTURE OF SOLENOID VALVES TO LEARN THE REASONS FOR THE UNIVERSAL ACCEPTANCE OF GENERAL CONTROLS

General Controls is one of the world's largest manufacturers of 2-wire controls. The sales leader of all General Controls is the Type K-3B Magnetic Gas Valve. Such popularity must be deserved.

Look at the record. In 1931 General Controls was first with a two-wire, current failure, quiet AC valve with a rotatable terminal junction, definitely designed to eliminate magnetic sticking. In combination, these advantages were not available in any other solenoid valves 10 years ago. The K-3B won immediate acceptance.

Three years later General Controls was first to incorporate interchangeable coils; first to utilize bonnet union construction for accessibility to working parts; first to reduce solenoid size; first to really lessen current consumption.

All this made a better valve for the industry at a lower cost. How fundamentally correct each of these were! For the Type K-3B is of the same basic design now—as then. Because of constant improvement, exhaustive testing, rigid inspection, the Type K-3B rides the wave of universal acceptance.

Before you buy—compare. Type K-3B valves are available in the widest ranges of sizes, from  $\frac{3}{8}$ " to 6", fulfilling the requirement of most gas applications. 1940 Catalog gives full details. Write for it.

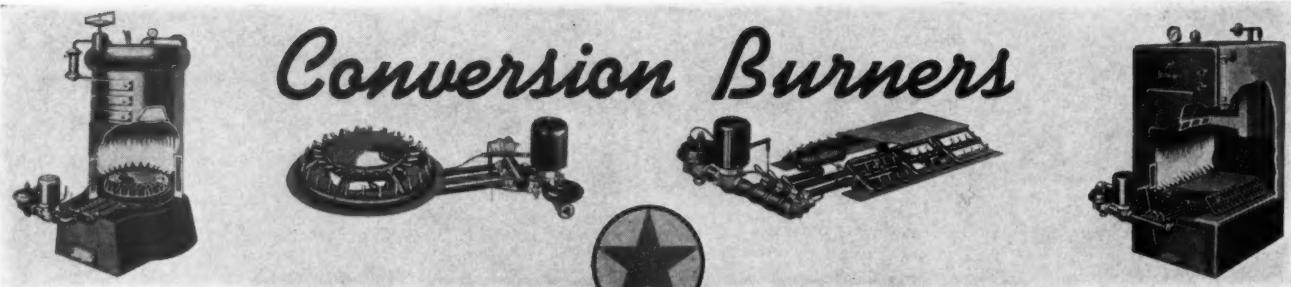
**T-30 GAS HEATING PACKAGE SET**  
Includes humless Type K-3B gas valve, the new T-70-1 two-wire, low voltage thermostat, transformer and 30 feet of wire. Night shut-off and heat anticipation available.



# GENERAL CONTROLS

450 East Ohio Street, Chicago, Illinois • 25 North Live Oak Street,  
Houston, Texas • 1505 Broadway, Cleveland, Ohio • 421 Southwest Boulevard, Kansas City, Missouri • 915 Bryant Street, San

Francisco, California • 267 Fifth Avenue, New York City • 700 West Ivy Street,  
Glendale, California • 6432 Cass Avenue, Detroit, Michigan • 687 Boylston  
Street, Boston, Massachusetts • Distributors in all principal cities.



## Conversion Burners

Star performance at the heart of



the gas appliance—The BURNER!

# Are YOUR Gas Appliances Equipped with BARBER BURNERS?

A hallmark of Quality in any gas appliance is the outstanding fact—it is equipped with a Barber Burner! Manufacturers to the number of 160 have adopted Barber Units as standard. The significant thing about this situation is the manufacturer's justified pride in having, as the heart of his appliance, the finest burner unit obtainable. The added sales appeal of such equipment is a potent factor in any merchandising picture.

In 20 years' incessant development, Barber has brought its impinged jet principle to the highest flame temperature so far attained on atmospheric pressure—1900°. This represents almost the only advance in 25 years in basic methods of combustion, since virtually all other burners still employ the primitive "Venturi Tube" principle. In patented Barber Jet Tubes, above the gas orifice is an all-important auxiliary air feed which creates a vacuum as the pre-mixture leaves the jets, projecting into the flame the extra air necessary for highly efficient combustion on increased gas pressure. This principle is exclusive with Barber.

See that gas appliances which you buy, sell, make or sponsor are Barber-equipped. That means unrivaled efficiency, lasting service, super-economy!

Only a few typical Barber designs shown here. We are gas burner specialists, and offer you freely our laboratory and engineering facilities on the design and manufacture of burner units appropriate for your specific purposes. Write for complete Catalog and Price List on Burner Units for Gas Appliances, Conversion Burners for Furnaces and Boilers, and Gas Pressure Regulators.

**THE BARBER GAS BURNER COMPANY, 3704 Superior Avenue, Cleveland, Ohio**  
*Address Michigan Inquiries to The Barber Gas Burner Co. of Michigan, 4475 Cass Ave., Detroit*

## Appliance Burners



# BARBER *Automatic* JET GAS BURNERS



## INDEPENDENT Developed a Winning Team in "Fabrikated" Construction

- The Independent "Fabrikated" Cold Air Face produced more than twenty-five years ago was the first of the greatest team of registers and cold air faces the trade has seen—Independent "Fabrikated" Floor Registers and Cold Air Faces, Wall Registers and Grilles, and Air Conditioning Registers in a great variety of types, sizes and finishes. Independent "Fabrikated" is noted for strength, rigidity and open area. Whatever the need, you can best fill the specifications with Independent "Fabrikated." Send for Catalogs.

THE INDEPENDENT REGISTER CO.

3747 EAST 99<sup>th</sup> STREET

CLEVELAND, OHIO

440

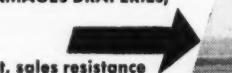
**INDEPENDENT "Fabrikated"**<sup>(REG. U.S. PAT. OFF.)</sup>

FLOOR REGISTERS AND COLD AIR FACES  
AND AIR CONDITIONING REGISTERS AND GRILLES

# L·O·F WINDOW CONDITIONING HELPS YOU SELL YOUR OWN *heating equipment*

TIE IN WITH THIS  
L·O·F CAMPAIGN AND BOOST  
YOUR OWN SALES!

● When you recommend Window Conditioning to home owners and prospective home builders . . . when you stress its advantages in your contacts with building contractors . . . you are creating additional business for yourself—because Window Conditioning (storm windows) helps sell automatic heat and air-conditioning equipment. Here are the reasons:

- 1** When fuel bills are reduced, more people can afford to buy the equipment you sell and pay for it out of fuel saving. **WINDOW CONDITIONING REDUCES FUEL BILLS** —IN MANY CASES AS MUCH AS 30%. 
- 2** When the only drawback to winter air conditioning is removed you'll sell more air-conditioning equipment. **WINDOW CONDITIONING HELPS GET RID OF THE NUISANCE OF FOGGY WINDOWS**—EXCESSIVE CONDENSATION THAT DAMAGES DRAPERIES, WALLS, RUGS AND WOODWORK FINISHES. 
- 3** Where people can use smaller heating equipment, sales resistance to the equipment you sell is reduced. **WINDOW CONDITIONING PERMITS THE USE OF SMALLER AND LESS COSTLY HEATING EQUIPMENT WITHOUT IMPAIRING HEATING EFFICIENCY.** 

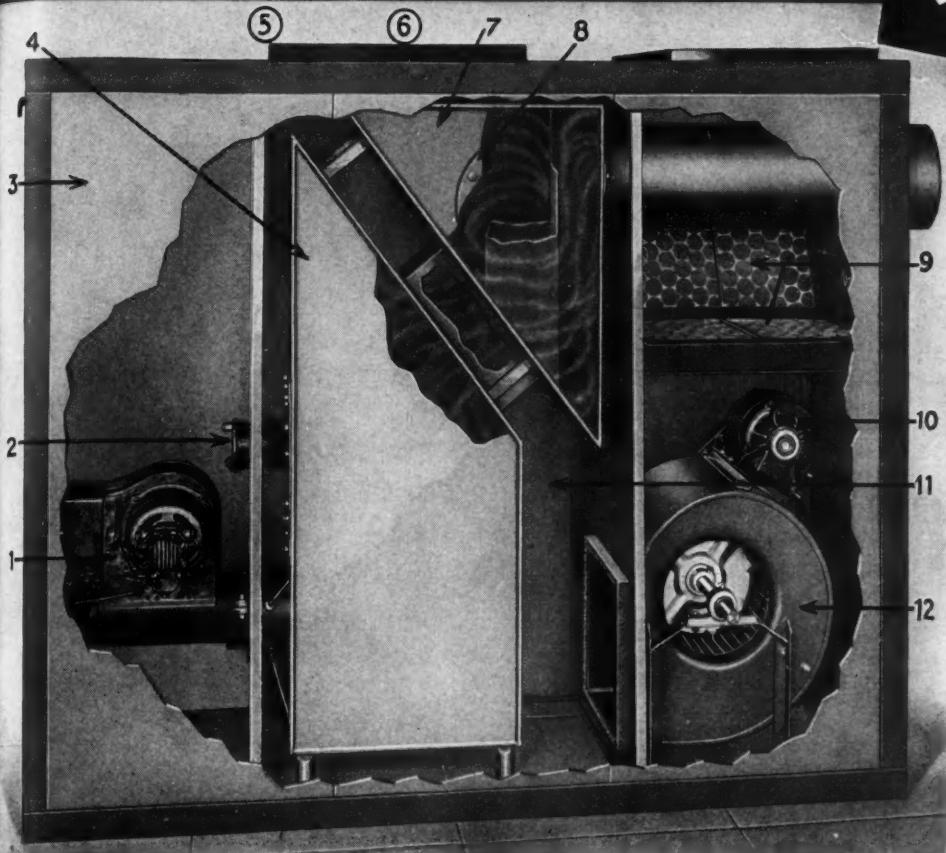


The L·O·F 1940 Window Conditioning Campaign is under way. It's bigger, better, more forceful than ever—national advertising—radio—direct mail. It will convert thousands into storm window users. It will create new opportunities for you to sell your equipment. You'll be well repaid if you tie in with something that reduces the operating cost and increases the efficiency of your equipment . . . Libbey·Owens·Ford Glass Company, Toledo, Ohio.

**LIBBEY·OWENS·FORD**   
**QUALITY GLASS**

# NEVER BEFORE

AN AIR CONDITIONER  
OF SUCH OUTSTANDING  
QUALITY PRICED SO LOW



## The Only Low-Priced Air Conditioner With ALL These Advantages!

- Combination fan and limit control switch
- Rust proof humidifier
- Pre-formed combustion chamber furnished
- Ample filter area
- Quiet blower
- Famous Fluid Heat Pressure Burner, the "World's Economy Champion"
- Uniform air flow that eliminates hot spots in exchanger
- One-piece welded exchanger of copper-bearing steel
- Finish baked by infra-red method
- Gas-tight design

**CUT-AWAY VIEW SHOWS INTERNAL CONSTRUCTION** of Fluid Heat FHA unit. Here's your guide. (1) Fluid Heat Oil Burner (2) Inspection port (3) Handsome metal jacket (4) Primary heat exchanger (5) Fan and Limit Control (not shown) (6) Humidifier (not shown) (7) Secondary heat exchanger (8) Clean-out opening (9) Spun glass filters (10) Blower motor (11) Heavy insulation (12) Quiet blower.



TRIM, SHARP LINES of amazing new unit, clinch sales for builders. Mail coupon for facts about this air conditioner.

# fluid heat

AIR CONDITIONER

"World's Economy Champion"

A PRODUCT OF THE ANCHOR POST FENCE COMPANY, BALTIMORE, MD. ESTABLISHED 1892



Here's how Fluid Heat can give you such quality at a price that makes the industry sit up and take notice. We keep production costs to a minimum—and design and build every part of the unit ourselves. Our large, modern plant is just five miles from the source of steel supply. Steel is delivered to our own siding, unloaded by electric cranes, carried by electric platform trucks direct to the most modern, fast-working metal forming machines. Line methods are used in production. Thus, expensive handling and shipping costs are eliminated. And the finished product of outstanding quality undersells the market.

Fluid Heat's new Air Conditioning Furnace puts you right in line to meet—and beat—competition on small home jobs. Here's the first air conditioning furnace unit built complete by one manufacturer that is equipped with a high pressure burner that burns as little as  $7/10$  g.p.h. efficiently—an 80,000 BTU unit that's smartly styled, appealing to the eye. Designed for top efficiency, complete in every detail, it offers features found in no other similarly-priced air conditioner. Together with Fluid Heat Oil Burning Hot Water Heaters, it enables you to specify a modern, low-cost heating system for every type of small home.

Look over the list of features on this page. Compare them with any on the market. Then compare prices. Two to one, you'll agree that here's the air conditioning furnace buy of the year. If you want more information about it, drop the coupon at the bottom of the page in the mail right now. We'll send you—without obligation—the complete story of this remarkable new unit and the entire Fluid Heat line of Air Conditioning Furnaces. Do it now.

## MAIL COUPON TODAY

Fluid Heat Division  
Anchor Post Fence Co.  
6723 Eastern Avenue, Baltimore, Md.

Gentlemen:  
Please send me complete information at once regarding your New Fluid Heat Air Conditioners.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

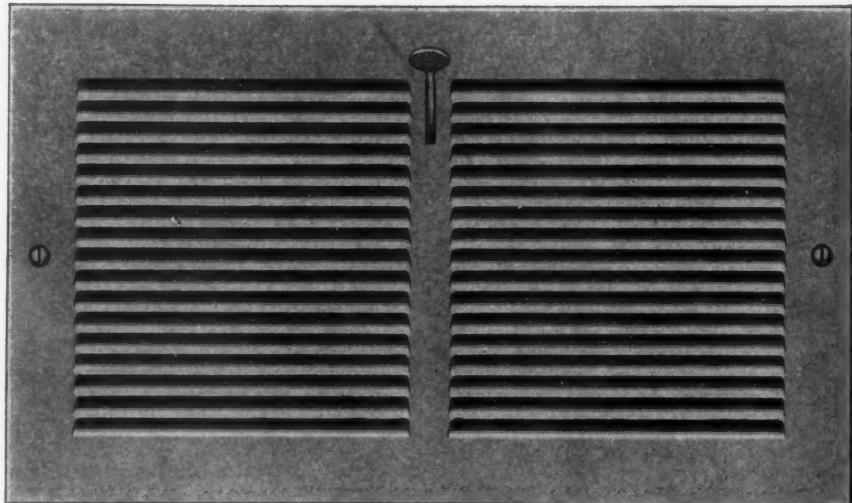
AUER

"7000" MODEL

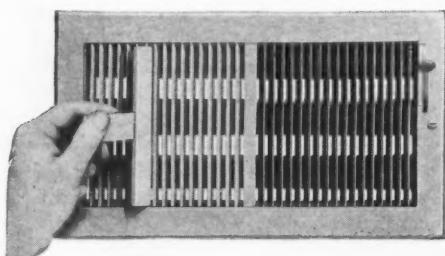
# AIR-FLEX



ADJUSTABLE FOR  
UP and DOWN FLOW



Airo-Flex is also made in the "4000" Series with vertical bar grille and multiple louvre. Method of adjustment of grille bars shown below.



Here's fine appearance and real economy in an air conditioning register that is adaptable to many jobs. This Auer Airo-Flex "7000" is adjustable for directional flow control, up, straight or down. Grille bars are set at the factory for  $22\frac{1}{2}^{\circ}$  downward deflection, but are adjustable for other angles. These registers are equipped with single louvre, and made in a complete line for wall and baseboard use, and for intakes.

A product of true Auer quality, well made and finished, the "7000" is of especially simple construction, with no complicated parts, and very easy to install.

Try this popular economy register. On request, we will send you complete Auer Register Book 40, together with name of your nearest Auer distributor.

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

**AUER** DISTINCTIVE **REGISTERS**  
**& GRILLES** THE **For Air Conditioning and Gravity**

*All Right-* **YOU** check the reasons  
why it pays to sell

**SUNBEAM**  
WARM-AIR FURNACES AND  
AIR CONDITIONING UNITS

- A complete line of furnaces for all fuels
- A complete line of Air Conditioners for all fuels
- Preferred by leading Architects and Builders. Sizes for Small Homes
- Convenient jobbers' warehouse stocks everywhere
- A sales-stimulating easy payment plan
- A program of consumer advertising
- Many types of dealer helps
- More Heating Contractors sell Sunbeam than any other make
- Backed by the best known name in heating and plumbing

WRITE TODAY FOR THE NAME OF THE  
SUNBEAM JOBBER NEAREST YOU

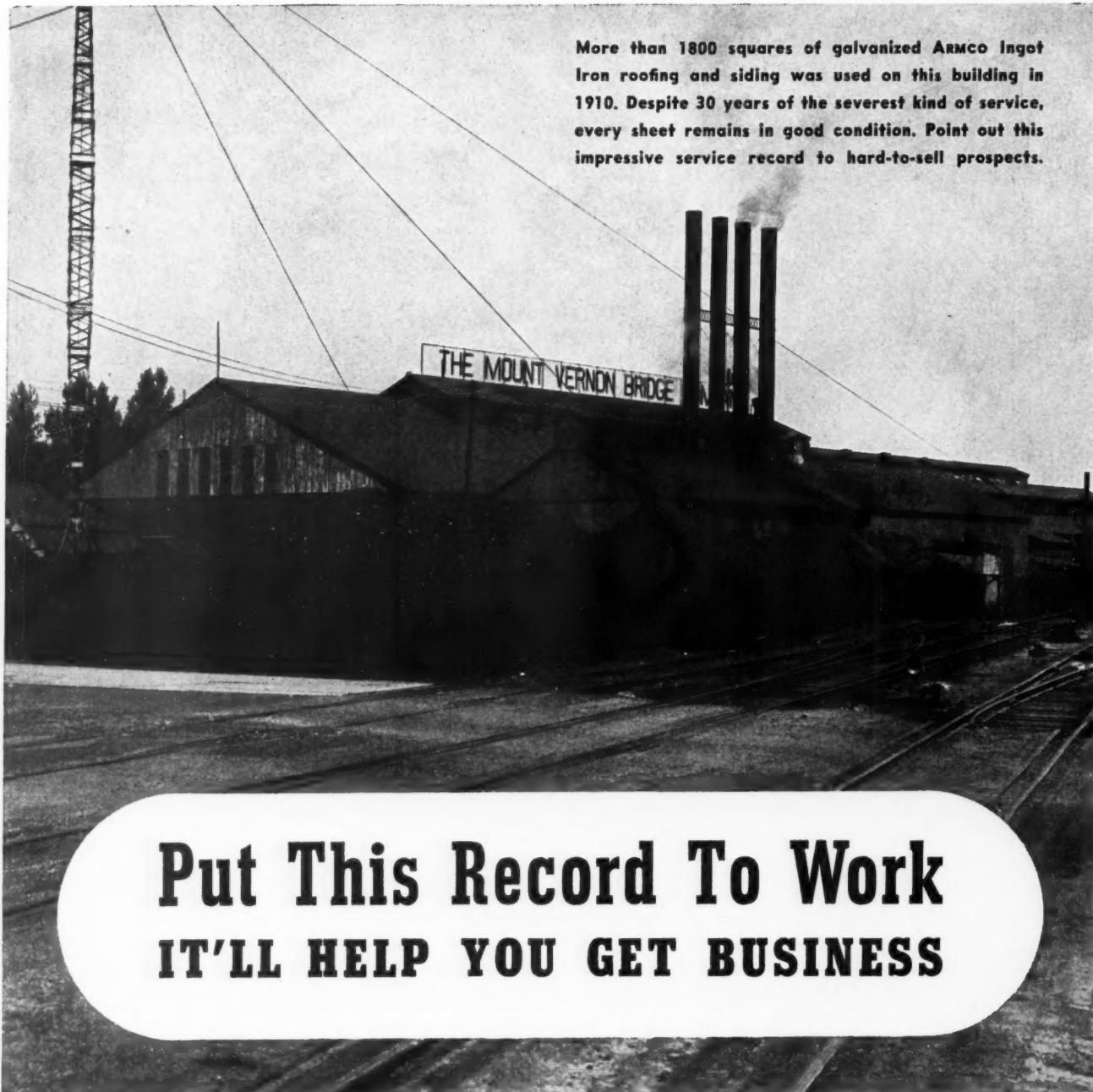
Visit our building at the New York World's Fair.  
Ask for Mr. Frank Stubbs, our Exhibit Manager.

**AMERICAN & Standard**  
**RADIATOR & Sanitary**

New York CORPORATION Pittsburgh

Copyright 1940, American Radiator & Standard Sanitary Corporation

\* \* \* \*  
DEFEND OUR COUNTRY. ENLIST  
NOW IN THE U. S. ARMY OR NAVY



## Put This Record To Work IT'LL HELP YOU GET BUSINESS

It is only natural for your customers to want all they can get for their money. Which is why some take a show-me attitude toward the enduring qualities and economy of sheet metal work. Invariably you can convince these Doubting Thomases quickly by giving them this impressive record of ARMCO Ingot Iron durability:

In 1910 the Mt. Vernon Bridge Company at Mt. Vernon, Ohio, used 150 tons of galvanized ARMCO Ingot

Iron for roofing and siding on a plant building. That was 30 years ago; yet today the covering is giving complete and satisfactory weather protection. Every sheet is clean and free from serious rust-action.

This record of actual service is especially impressive when you look at the conditions. Smoke and cinders from the company's own power house, corrosive fumes from a nearby foundry, and soot and cinders from pass-

ing locomotives combine to make the going tough. All this had little effect on the ARMCO Ingot Iron covering.

What greater proof of durability could your customers ask? Your skillful work and ARMCO Ingot Iron make a strong team — strong for selling, strong for satisfaction, strong for profit. Ask your ARMCO Distributor for the rest of this interesting story. The American Rolling Mill Company, 2421 Curtis Street, Middletown, O.

*Galvanized*



**ARMCO INGOT IRON**

# "What's different about selling G-E ...from any other brand?"

*Listen to Louis S. Doherty and Ruffin G. Stirling  
of Doherty-Stirling, Inc., successful G-E Dealers  
in Baton Rouge, La. They tell you the difference.*

(Reading time—2½ minutes)

## "Prospects half sold right off the bat!"

"In the first place, prospects know G-E. So we're selling to folks who are *interested*—who like to own things with the G-E reputation.

"When we tell them all about the engineering and research that went into making the finest heating and cooling and refrigeration equipment—it *registers*. They're half sold *before* we even mention actual products or prices.



## "Couldn't ask for a better dealer set-up"

"When we took on G-E the distributor and representative moved right in and helped organize our business to go places. We got special training in selling. Engineering. Installing and servicing. Display and literature the best we've ever seen. Local newspaper advertising over our own name. Direct mail campaigns. And we get prospects developed by the national and trade advertising.

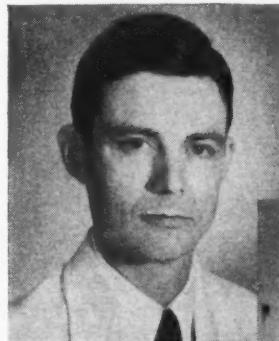
## "Complete line means year 'round sales and profits"

"When you sell G-E you're selling what we call a really *complete* line of fine merchandise. G-E offers us something to sell *every* prospect. All three lines keep us busy all year long. And we figure on making *sales . . . and profits . . . every month in the year*.

"When Heating sales slide off, Cooling and Commercial Refrigeration sales keep profits up. It's the answer to those up and down sales curves we used to have."

## "The company is smart in advertising 'turn to G-E'

"Because, whatever people want we can give them G-E products to do a superfine job. *Automatic Heating* for example. *Gas or oil. Radiator or warm air.* Then there's *G-E Packaged Air Conditioning* for cooling one room or an office. Larger units for stores and restaurants. And

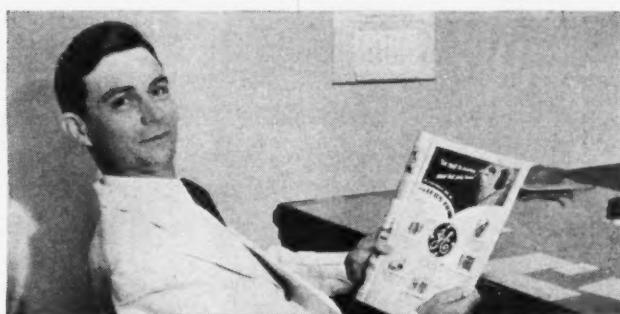


LOUIS S. DOHERTY



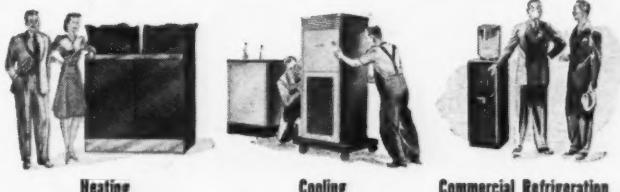
RUFFIN G. STIRLING

*Commercial Refrigeration. Water coolers and beverage coolers. Walk-in and reach-in cabinets. And Condensers. There's a healthy replacement market for them alone.*



## "Many other advantages"

"That is one of the biggest advantages. Having a distributor and a representative handy all the time is another. When we get stuck on a tough selling or technical problem. Carrying a minimum stock that keeps overhead down is still another advantage. And it's good business knowing we've got the entire G-E organization behind us!"



**GENERAL ELECTRIC**

You can be a G-E Dealer if you can fill certain requirements.  
For year 'round profits, fill in and mail the coupon today.

GENERAL ELECTRIC CO.  
Division 199-953, Bloomfield, N. J.

I want all details on the G-E Dealership for my territory.

Name. \_\_\_\_\_

Street. \_\_\_\_\_

City. \_\_\_\_\_ State. \_\_\_\_\_

# Magneseal Makes the Big Difference in Penn-Built Warm Air Controls

*You Can Forget Fancy Claims.. It's the Contacts that Have to "Take It"*

Installation and service men have said: "Penn is missing a good bet by not telling more about the Magneseal contact unit, instead of waiting for us to find out about it from field experience."

The men in the field are right. A limit control, fan control or combination control is only as good as its current carrying unit, or contact structure. It's the contacts that take the punishment over long years of service. So that makes Magneseal the BIG reason why Penn Warm Air Furnace Controls have such an outstanding field service record.

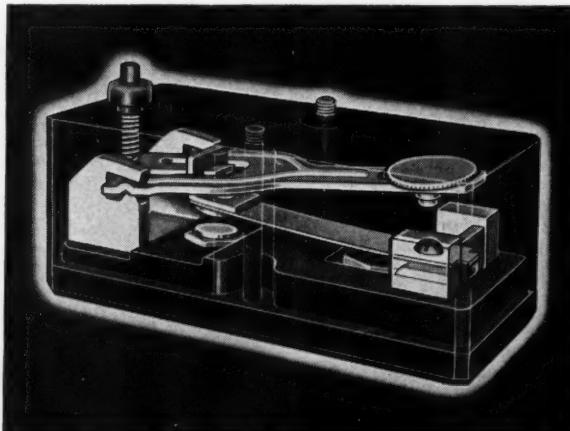
Briefly, Magneseal is: **1.** A snap-acting, magnet contact structure, originally patented by Penn and incorporating Penn's latest improvement patents. **2.** A contact structure from which all troublesome flexible leads have been eliminated. There are no internal wires . . . no soldered connections . . . inside Penn Furnace Controls. **3.** A contact structure which handles low voltage or line voltage (to 250 V.) circuits with equal dependability. **4.** A non-breakable, completely enclosed contact unit—tamper-proof and free from dust and moisture problems. **5.** A standardized, factory adjusted contact unit, completely interchangeable.

These points sound good on paper, but actually, here's what they mean to the automatic heating installation and service man: **1.** Positive contact action under all

normal conditions of equipment vibration, regardless of mounting position.

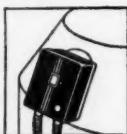
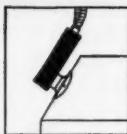
- 2.** Complete elimination of internal connection "breaks," over a lifetime of service.
- 3.** One standard stock of furnace controls for all applications—line or low voltage.
- 4.** Freedom from dust and moisture problems without the hazard of breakage.
- 5.** A standard unit for replacement if original contacts should ever become damaged by abnormal load conditions. Merely remove two mounting screws and install new Magneseal unit. No contact adjustments to make . . . no new settings to make on the installed control.

Magneseal is not "something new." In Penn Controls, it has been through four years of successful service. Try Penn Furnace Controls on your next job. Learn why today's users are repeat buyers.



#### MOUNT IN ANY POSITION.

Penn Furnace Controls, incorporating the patented Magneseal contact unit pictured above, may be mounted in any position. Insert the helix in the bonnet. Rotate it to the best position for true air temperature operation (Penn ball and socket flange makes this easy). Turn it for most convenient wiring. There is no "upside down" position with Magneseal.

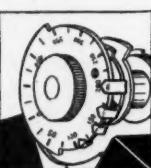


#### WIRING IS EASY

with Penn Bonnet Controls. Standard fan controls, limit controls and combination controls are two-wire. For two-speed fan control and special applications, three-wire controls (single pole, double throw) are available. Wiring terminals on all types are a part of the Magneseal contact unit, as shown.

#### CONVENIENT ADJUSTMENT

is a feature of all Penn Warm Air Controls. Settings are plainly marked . . . easily changed. Standard controls have adjustments concealed under cover to discourage tampering. Available with external adjustments when necessary or desirable.



#### SUMMER-WINTER SWITCH

is standard on all Penn Fan Controls and combination Fan and Limit Controls. Permits operation of the fan for summer ventilation by means of upstairs manual switch, without changing the winter operation setting of the control.

**PENN BONNET CONTROLS** are available for all warm air heating applications. Standard units include single and two-speed fan controls, limit controls, combination fan controls (single or two-speed) with limit controls, fan, limit and relief fan controls for stokers, fire protection controls.



Type 512AT02 Warm Air Limit Control interior, typical of the simplicity of all Penn Bonnet Controls.

More information on what Penn Controls will do for you—One of a Series.



**Penn-Built Controls for Many Applications**

Thermostats, Bonnet Controls, Ductstats, Fire Protection Controls, Water Temperature Controls, Boiler Pressure Controls, Boiler Water Level Controls, Humidistats, Stack Switches, Stoker Timer Relays, Solenoid Gas Valves, General Purpose Relays, Solenoid Refrigerant and Water Valves, Refrigeration Pressure and Temperature Controls, Water Valves, Pump Controls, Air Compressor Controls, Air Volume Controls, Line Starters.

If THE  
QUESTION IS

The  
ANSWER IS

# WHAT MAKE OF MOTOR SHALL I USE?

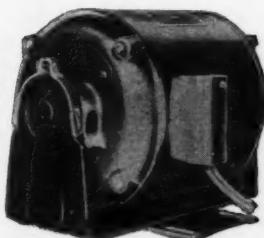
## "A WAGNER MOTOR" — AND HERE'S WHY

### A FEW OF THE MANY WAGNER MOTORS IDEALLY SUITED FOR AIR-CONDITIONING EQUIPMENT



TYPE M, SHADED POLE FAN motor is a single-phase induction motor of simple construction. Ideal for fan and blower drives in which the fans are mounted directly on the motor shaft. Totally-enclosed and open-type; rigid or resilient mounted; 1/250, 1/125, 1/80, 1/40 and 1/30 hp.

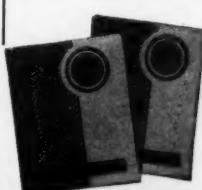
TYPE RA, REPULSION-START-INDUCTION motors are single-phase brush-lifting motors having high starting-torque and low starting-current. The ideal motor for heavy duty applications such as stokers, compressors, pumps, etc. Obtainable in various speeds, frequencies, and voltages; rigid or resilient mounted; 1/8 to 15 hp.



TYPE RP, SQUIRREL-CAGE motors are made in 7 electrical types varied as to torque and current characteristics to take care of a wide variety of applications. 2 and 3 phase; 1/6 to 400 hp.



TYPE RK, CAPACITOR-START INDUCTION-RUN motors are suitable for driving refrigerators, household air conditioners, and other appliances. Drip-proof or totally-enclosed endplates; rigid or resilient mounted; 1/8 to 3/4 hp.



#### THESE BULLETINS WILL HELP YOU

You should have copies of Wagner bulletins MU-177, and MU-182. They contain motor information of value to you. Write for your free copies today.

MOTORS • TRANSFORMERS • FANS • BRAKES

*It's Easy* to select a Wagner motor that exactly fits the job because Wagner motors are built in a wide range of types and sizes with electrical and mechanical characteristics to fit the varying requirements of all types of air-conditioning equipment.

The trouble-free performance of Wagner motors builds customer satisfaction and good will. Service calls not only annoy the customer but sometimes seriously reduce your profit on the installation. Take a tip from the many manufacturers of air-conditioning equipment who are now using Wagner motors. They have found from actual experience that Wagner motors give dependable service under all types of operating conditions.

It will pay you to acquaint yourself with the complete line of Wagner motors.

Wagner maintains 25 sales and service branches conveniently located throughout the country. Trained sales-engineers are always ready to assist you in selecting the exact motor for your requirements. Each of the 25 Wagner branches carries a stock of motors ready for immediate shipment.

MAIL COUPON TODAY

Wagner Electric Corporation  
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

Gentlemen:  
Please send me FREE bulletins MU177 and MU182.

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Firm \_\_\_\_\_

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City \_\_\_\_\_ State \_\_\_\_\_



*...I Wonder Where We Can Get It?*

## MONCRIEF, of Course

### SEE ALL THAT MONCRIEF OFFERS YOU -

#### WINTER AIR CONDITIONERS

- Aristocrat Oil-Fired
- Special Oil-Fired
- Utility "55" Oil-Fired
- Aristocrat Coal-Fired
  - with cast heating unit
- Aristocrat Coal-Fired
  - with steel heating unit
- Series "700" Stoker-Fired
  - with steel heating unit
- Series EE Coal-Fired
  - with steel heating unit
- Moncrief Square-Cased
  - with Blower Filter Unit
  - cast and steel heating units
- Aristocrat Gas-Fired
- Special Gas-Fired
- "BAC" Gas-Fired
- \*

#### WARM AIR FURNACES

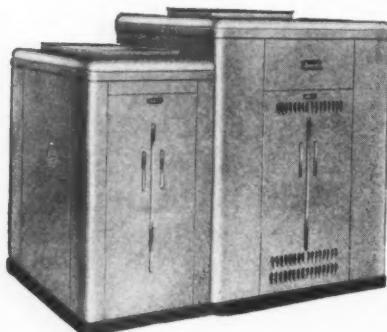
- De Luxe Long Life
  - cast and steel heating units
- Standard Long Life
  - cast and steel heating units
  - \*
- Series "C" - Cast
- Series "S" - Steel
- Series "D" - Steel
- Series "E" - Steel
- In square cased enameled finish and standard galvanized casings
- \*
- Series "F" Cast
- \*
- Series "GG" Gravity
- Gas Furnaces
- \*
- Moncrief Blower Filter Units
- \*
- Moncrief Automatic Humidifiers
- \*
- A Complete Line of Warm Air Heating and Air Conditioning Pipe and Fittings

WHENEVER you have a situation that calls for a unit of unusual requirements, you can be sure Moncrief can supply you. For the Moncrief line is complete in every particular. It enables you to fill ALL the warm air heating and air conditioning needs of your community, to the advantage and satisfaction of your customers and your own profit.

Besides, Moncrief provides a convenient Financing Plan, a helpful Engineering Service, and effective advertising literature.

Tell us what you want and we'll send literature and prices.

**THE HENRY FURNACE & FOUNDRY CO.**  
3473 E. 49th ST. CLEVELAND, OHIO



ARISTOCRAT  
OIL-FIRED  
AIR CONDITIONER



MONCRIEF  
DE LUXE  
LONG LIFE  
with 20-year Guarantee



**This High Quality, Low Cost Register  
is PERMANENTLY STREAK-PROOF!**

**CHAR-GALE  
"Seal-Tite"  
REGISTER**

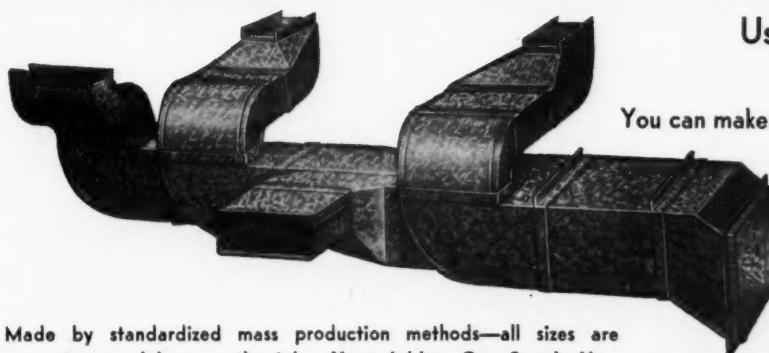
**QUALITY Maintained —  
PRICES Reduced!**

If you want a quality register at a low price that is completely and permanently STREAK-PROOF—get the facts on Char-Gale "Seal-Tite". Here's a register that has everything you want—at a price you'll like. It pleases your customers, saves your time and cuts installation costs. Our exclusive flexible packing member is an integral part of the back frame. Handsome in appearance—maximum capacity—air flow directed for comfort without drafts. Baseboard and sidewall types.

The tremendous demand for the Char-Gale "Seal-Tite" has increased production and made possible our new low prices—yet quality has been strictly maintained.

**ASK YOUR JOBBER for our NEW LOW PRICES!**

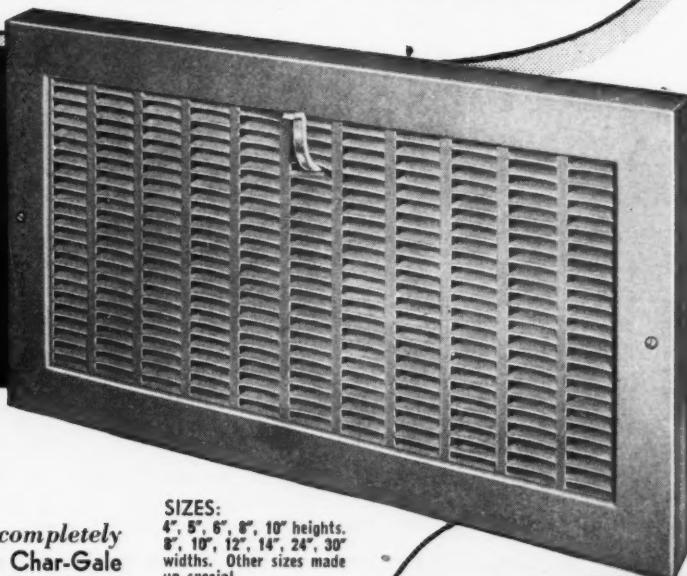
**CHAR-GALE "Pre-Fabricated" DUCTS and FITTINGS**



Made by standardized mass production methods—all sizes are accurate—no delays on the job. Your Jobber Can Supply You.

**SEND TODAY FOR NEW CATALOG No. 40**

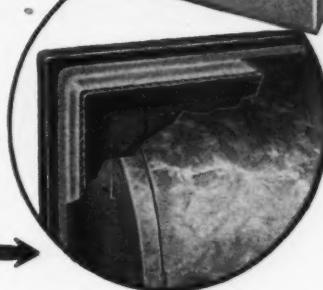
This catalog gives you details and prices on the complete Char-Gale line of Registers, ducts and fittings. It also includes the Char-Gale "Quick-Method" Estimating Chart which gives you accurate duct sizes for any job, and figures costs for you. Send the coupon today.



**SIZES:**  
4", 5", 6", 8", 10" heights.  
8", 10", 12", 14", 24", 30" widths. Other sizes made up special.

**"Seal-Tite"  
One-Piece  
Construction**

Look at this construction—an exclusive flexible packing member is an integral part of the back frame. It makes a streak-proof joint—simplifies your job—satisfies your customers. Only Char-Gale has it.



**Use them on Your Next Job—  
See How Much You Save**

You can make extra profits with CHAR-GALE "Pre-Fabricated" DUCTS and FITTINGS, which will handle your jobs practically 100% complete.

Our fittings automatically take care of the engineering for you. Our Drafting Department will gladly make your plans free of all charges. Try us out on your next job. You'll be delighted with results.

**CHAR-GALE MANUFACTURING CO.**

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Please send me Catalog No. 40. I am interested in:  
 CHAR-GALE "Seal-Tite" REGISTERS  
 CHAR-GALE "Pre-Fabricated" DUCTS

Name .....

Address .....

City ....., State .....

JOBBER'S NAME .....

# "WE HUNG 22,000 FEET OF TONCAN IRON GUTTERS— and every foot at a profit!"

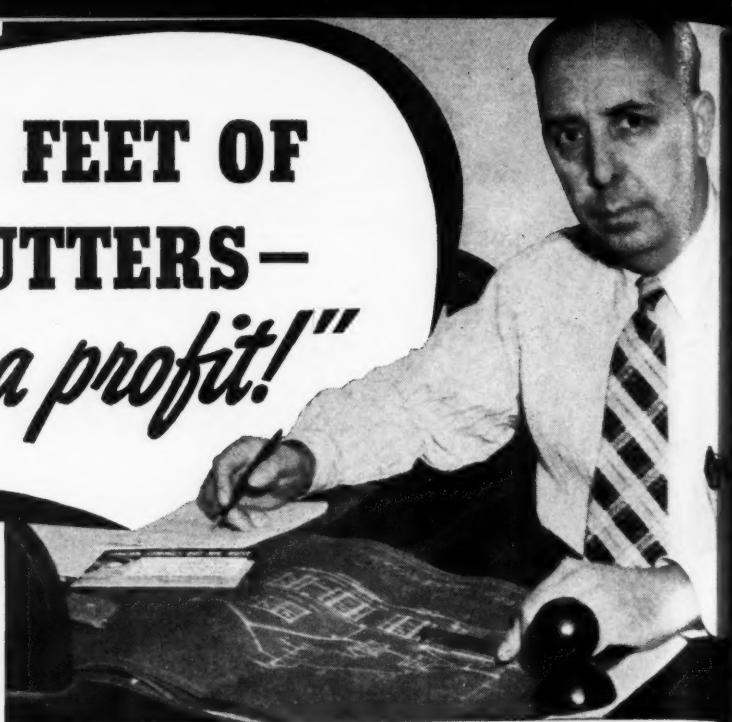
In 1933, L. M. Binkley formed the L. M. Binkley Sheet Metal Works, Indianapolis, Ind. Has he made a success of his venture—and has Toncan Iron helped him? Read his own statement—it may help you.

Reading time: 1 minute, 45 seconds

"Ever hear of a sheet metal that vanished? Then take a look below at that stock of Toncan\* Iron Galvanized Sheets recently delivered. Within no time at all, that stock will have dwindled to nothing...vanished into thin air.

"That's because we specialize in Toncan Iron gutters.

"Prior to 1933, I worked in another shop which used Toncan Iron and a competitive material. I had plenty of opportunity to compare the qualities of the two. At that time I made up my mind that when I had a shop of my own Toncan Iron would be my metal.



"When you tell a customer that you use this metal, you establish yourself as a competent contractor. I tell people that Toncan will last twenty years or longer, and to prove that point I show them the good condition of the Toncan Iron gutters which I installed on my own house in 1920.

"If price is questioned, I simply explain that in any metal job, labor is a large percentage of the cost. The difference in price between Toncan Iron and ordinary sheet metal is negligible.

"As for working qualities, Toncan Iron is soft and easy to work. Result...jobs move along in the shop without delay. Here is an experiment that drives home that fact:

"I hand a fellow a strip of Toncan, a strip of competitive metal and a pair of pliers. I suggest he bend the pieces back and forth a few times as we do in the shop. That is the quickest way to convince him of Toncan Iron's ductility.

"Last year, between April and November, we hung 22,000 feet of Toncan Iron gutters *and every foot at a profit!* In all of last year and so far this year, there hasn't been one lost hour of working time. I'm quite proud of that record.

"So my advice to any sheet metal man is...tell the world that you use Toncan Iron, a quality metal, and that you do quality work. You'll be surprised how quickly they become accustomed to saying... 'Call in John Doe, I have confidence in him!'

"And when you get customers in that frame of mind, you can forget cutthroat competition."

• • •

We'll gladly send you literature on Toncan Iron and the name of your nearest Toncan Iron distributor. Write Republic Steel Corporation, General Offices, Cleveland, Ohio.



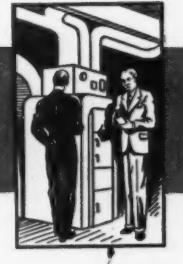
\*Reg. U. S. Pat. Off.



## REPUBLIC TONCAN IRON

An alloy of refined open-hearth iron, copper and molybdenum  
—that grows old slowly

BERGER MANUFACTURING DIVISION  
NILES STEEL PRODUCTS DIVISION  
STEEL AND TUBES DIVISION  
UNION DRAWN STEEL DIVISION  
TRUSCON STEEL COMPANY



## Fall and Winter Volume

**R**EPORTS from manufacturers' and jobbers' salesmen and from contractors in active building areas indicate that 1940—up to date—is exceeding 1939 volume by 25 per cent and more. New house construction, for the most part, seems to account for this substantial increase.

With the usually active fall and early winter season still ahead, it would seem as though 1940 is going to be one of the "big" years in warm air heating and sheet metal work.

Two questions are apparent. First, is new construction volume likely to continue into cold weather? Second, can replacement and repair work maintain volume if new construction lags due to an inclement fall or any unforeseen conditions?

Arnold Kruckman's Washington Letter in this issue (page 38) answers, briefly but poignantly, the question of new construction volume. If Washington's plans materialize in whole or even in part, the construction industry has "seen nothing yet" and new construction volume predicted will exceed our wildest expectations. Washington, says Mr. Kruckman, is talking \$300,000,000 to \$400,000,000 of new construction *monthly*—to total within the next two years some figure between six billions and eight billions of dollars. And, according to Mr. Kruckman's analysis, this is only building which will require some form of sheet metal or heating work.

Make no mistake. Not six to eight billions of sheet metal and heating work. But six to eight billions of construction on which there will be some percentage of sheet metal work, roofing, heating, air conditioning, ventilating, etc. Even so, if we apply our customary percentages, we can anticipate gigantic contracts for our industries.

We suggest a close scrutiny of this month's Washington Letter. Readers will find an explanation of the two chief methods under which contracts will be let to our contractors. This explanation suggests two methods of procedure. If the reader is already allied with some general con-

tractor and expects to continue in that relationship—be sure your general contractor expects to do government work. If the reader now bids independently or wishes to operate separately, be sure you get your name on the lists to receive job information and bid invitations. How, where, when is all explained by Mr. Kruckman.

Unless our ideas of government work for war pursuance are entirely erroneous, a very large percentage of our readers will not do war contract work. War pursuance buildings, as Mr. Kruckman describes them, are large buildings and large projects. Well financed, large scale operating contractors will get first choice. The exception will be in numerous single family, detached houses, which may be built but are not actively talked about today.

So much for the war activity we can look forward to this winter. What about the contractor who does job shop sheet metal work, furnace heating, winter air conditioning—in single family houses? New construction cannot proceed all through the winter at the pace set up to now. Furthermore, in the low sales price house there never has been and cannot be very large margins of profit. (See Low Cost House Heating Survey, July, 1940 issue).

The contractor who desires to operate in more leisurely fashion—fewer jobs at larger profits—will, this fall and winter, have to get business from two fields—the large, new house and the old house replacement and repair market. How have these fields been and how will they be?

Definite figures are lacking, now, but sketchy reports indicate a surprising sale of large furnaces; of gas, oil, stoker-fired units in large capacities. These units must be going into large new and large old houses. Under the impetus of FHA promotion on repair and remodel there is no good reason why this field should not be active all fall and winter. We understand, further, that certain experiments in promotion of repair and

(Continued on page 118)

*Arnold  
Kruckman's*



## *Washington Letter*

IT IS surprising how few people in the building industries seem to be aware that awards and contracts for national defense construction totalling \$609,317,079 have been announced the past 60 days by the White House. This program goes into every State and Territory and Possession of the United States, and lists separate jobs in 403 localities. The projects totalling this amount include only those which use sheet metal work and which require some form of roofing, heating, and often air conditioning. They naturally do not include the corollary local private building activities that inevitably must follow these Government jobs.

The significance of these figures chiefly lies in the implication of the huge sum to be spent during the next 20 months which grosses something between \$6,500,000,000 and \$8,000,000,000. Obviously that means that the White House lists each month will reveal new building projects, of a similar nature, totalling monthly somewhere between \$300,000,000 and \$400,000,000 and scattered similarly around the 48 States, Territories and Possessions. Under these circumstances it seems worth while knowing, at least, how this work is distributed, and how a business man may qualify for a share of it, if he wants it.

### War Building a Vast Problem

With rare exceptions the jobs are handed out by the Army and the Navy. They call this national defense work "temporary work," the phrase indicating the difference between these emergency jobs and the permanent work in the routine of the normal existence of the military services. At this writing, late in August, this national defense work still clutters up the bureaus in Washington to such an extent that many details of procedure have not yet been crystallized.

For instance, among the many laws passed when the War excitement began, one contained a clause providing that this building work must be done, under certain circumstances, at cost, plus a fixed fee. This is not our old

friend **cost-plus**, of World War days, under which some unpatriotic operators piled up huge profits by simply letting the cost soar and collecting the plus with more plus the higher the costs rose. No, this time the intent is that the cost shall be very closely watched by the Government officials and that the plus shall be a fixed fee, fixed at the time the contract is arranged.

### Fee Based on Estimate

It is true this fee will be a percentage; the law permits a maximum of 7%. But the intent is that the fixed fee shall be calculated when the contract is let and that the 7%, or whatever it may be, shall be estimated and fixed on the basis of the bid for the job. Incidentally, the bigger the job, the lower the percentage.

Just how this plan will be applied in a direct, practical sense has not been definitely worked out by either the Army or the Navy. Contracts and awards that have been allocated apparently have glossed this over and have left it in suspense until the legal lights of the Services have found the satisfactory answer.

### Where Will Excess Profits Begin

One of the chief reasons why there has been such delay and confusion in getting the whole building and manufacturing programs started is contained in this puzzle over working out the method of calculating profits. The problem is still up in the air and undoubtedly will remain up there until the new law is enacted which involves possibly a permissible higher profit margin for some industries and a crystallization of the excess-profits tax discussion.

Some manufacturing industries want the profits margin boosted to 12% before excess starts. Congress wishes to fix the excess-profits scale on a basis that will enable a business man to figure his taxes either on invested capital or on an average of earnings over a period of years, say, 1936, 1937, 1938 and 1939. If the excess profits are calculated on the in-

vested capital base, the business man would be allowed to include borrowed capital up to \$100,000 and he would be permitted to hold (free of excess-profits tax) all earnings up to 10% of invested capital.

The idea seems to be that a business earning less than 10% would do best to use the invested capital base, while an industry earning more than 10% on invested capital would do better to use the average earnings base. Treasury experts declare the new tax formula will increase the over-all tax rate of the majority of business units between 6% and 10%, bringing the total tax somewhere between 27% and 30%. Industries that make big earnings will be obliged to share hugely with Uncle Sam. A business that makes 50% on its invested capital will probably pay the Government 50% and more.

### Army-Navy Methods

There is some difference in the way the Army looks at the present building contracting business and the viewpoint of the Navy. The Army has divided the business into two general divisions. The smaller transactions (which are not so small, however), are called lumped-sum projects and, obviously, are let on a contract that defines a lump consideration for the whole undertaking. The large undertakings are handled strictly on the cost plus, a fixed fee basis.

### Where to Get Job Data

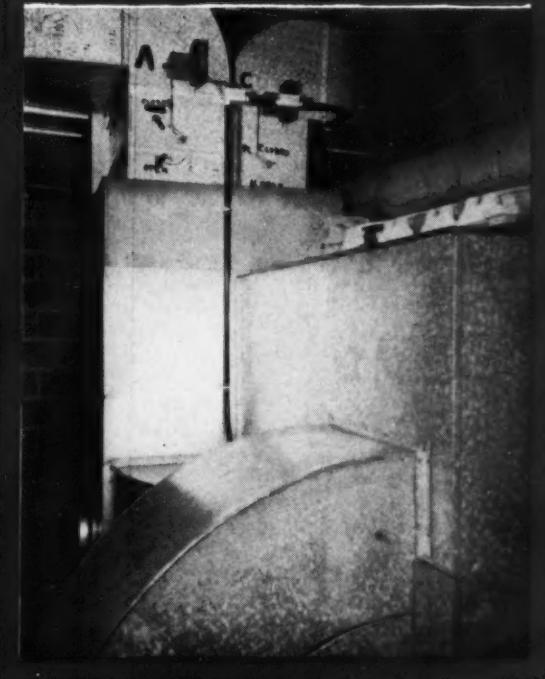
Of course, the entire building business of the Army is directed and controlled by the Quartermaster General. In some rare instances, as for example the great jobs in Alaska now in progress, the Quartermaster General does the work by what, for the want of a better phrase, might be called force account. (A Quartermaster officer was sent to Alaska last Spring; he hired the labor for the various fundamental work and supervised the installation of equipment on the job.) The entire building program is under the direction of Gen. Charles D. Hartman, Chief of the Construction Division. His headquarters are in the Munitions Building, 19th and Constitution Ave., Washington, D. C. The General is accessible and genial and sensible, and is ready to talk business with any person who has real business with him. He will readily answer any questions that come to him by phone, by telegram or by letter. If you wish detailed information about any job, or if you wish a pamphlet just issued with answers to the most routine questions that are received, write Gen. Hartman.

If you wish to be listed as a qualified contractor for Government construction work, write either to Gen. Hartman or to Maj. F. S. Harvey, Construction Division, Quartermaster General's Office, Washington, D. C.

(Continued on page 119)

AMERICAN ARTISAN

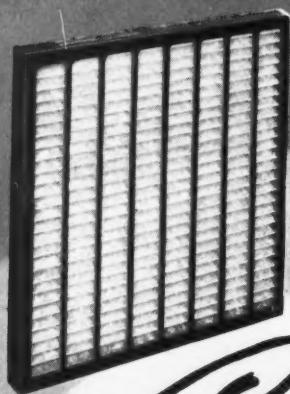
# RESIDENTIAL AIR CONDITIONING SECTION



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

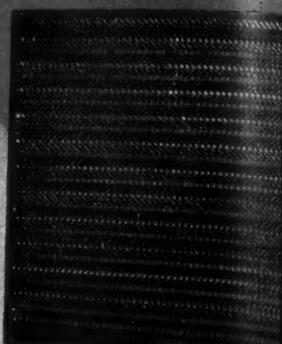
#### DRIFILTER TYPE G

contains a filter element made of pleated glass fibre; may be cleaned several times before renewing. Bulletin No. 297.



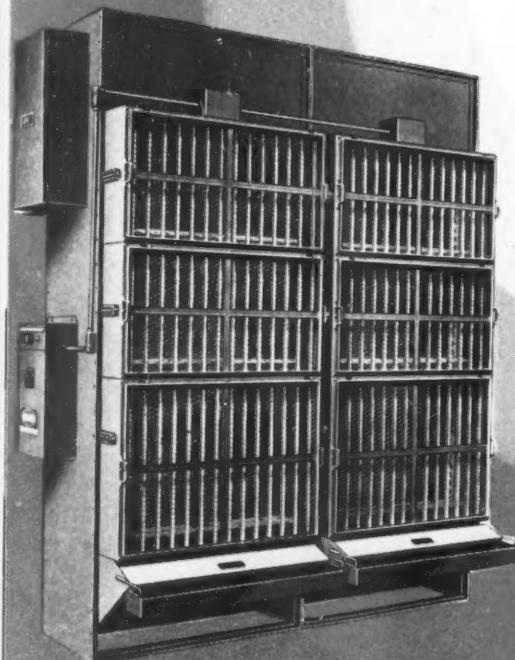
#### THROWAWAY RENEWABLE

designed to be discarded after accumulating its dust load and replaced with new unit. Widely used in unit air conditioners, warm air heating and in domestic air conditioning. Bulletin 117-E.



#### AIRMAT TYPE PL-24

for central air conditioning service. Uses Airmat paper or fibre glass media furnished in rolls. Bulletin No. 230-B.



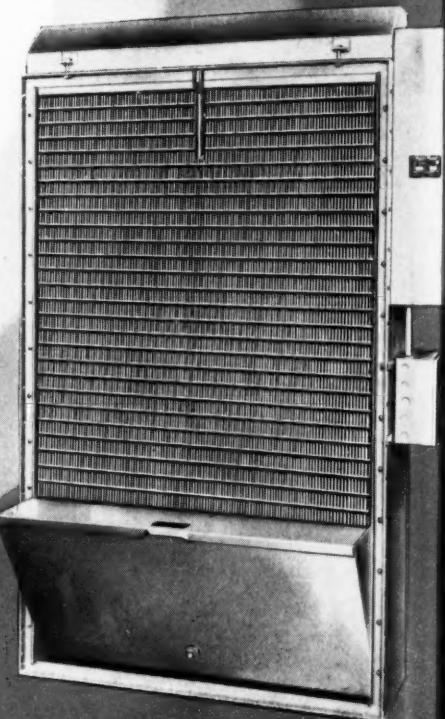
## Satisfactory AIR CONDITIONING REQUIRES GOOD FILTERS

Because air conditioning engineers recognize the importance of adequate cleaning at a minimum of expense and attention, American Air Filters have become the standard for air conditioning service.

AAF offers a complete line of filters engineered to meet every air cleaning requirement. Engineering data and bulletins as well as specific information on any air cleaning problem will be furnished by our Engineering Department.

**AMERICAN AIR FILTER CO., INC.**  
Incorporated

622 Central Avenue - LOUISVILLE, KY.



#### ELECTRO-MATIC AIR CLEANER

combines electric precipitation as an integral part of an automatic self-cleaning air filter for highest cleaning efficiency. Collects smoke, soot and fine dust particles. Bulletin No. 250.

#### MULTI-PANEL AUTOMATIC

with the new armored panel for commercial and industrial air conditioning. Self-cleaning — fully automatic. Bulletin No. 240-C.

*The Symbol of Clean Air*

**AAF**

DUST CONTROL

AIR FILTRATION

# Air Conditioning For the Relief of Cedar-Pollen Hayfever\* [Part 4]

By Alvin H. Willis and Howard E. Degler

Research Assistant and Professor of Mechanical Engineering  
The University of Texas, Austin, Texas

THE problem of filter testing is somewhat controversial. The primary reason seems to be that manufacturers frequently advertise their filters as being 98 to 99 per cent efficient whereas they may be only 50 to 60 per cent efficient. This variation is possibly due to the variety of test methods, the types of dust used in the tests, and the method of calculation. The methods of test generally consist of placing the filter in a fan and duct system that is so arranged that three primary operations can be made either simultaneously or continuously during the time of test. These operations are first, injecting dust or other foreign material into the air stream before it passes the filter, second, sampling the air before it passes the filter, and third, sampling the air after it passes the filter.

*Editor's Note: Several pages of the bulletin have been omitted here. The deleted sections describe the test apparatus and test procedure and are not of practical moment to the general interest.*

## Test Results on Commercial Mechanical Air-Filters

As all of the filters tested could be readily divided into several groups according to the filtering media, and the test results of the filters in each group were very nearly the same the following classification was used:

Group "A" included the filters with a dry cellulose mat. One filter included in this group was treated with an adhesive. Any such treatment will increase the efficiency of the media but it should be noted that this increases the pressure drop with a subsequent decrease in delivery. Group "B" included filters of the glass-fiber type covered with an adhesive. The glass fibers vary in size from a coarse fiber at the upstream side to a finer fiber on the downstream side. Group "C" included the filters of dry woven glass hair. This media unlike those of group "B" consists of glass fibers finer than human hair woven into a glass cloth. This glass cloth is a very substantial

type of media but its efficiency when used dry is lower than the other types of filtering media. If an adhesive were used in connection with this woven glass it is believed that the efficiency would be increased considerably. Group "D" included filters of cardboard cellular construction with an oil coating. This filter is the cheapest of all the filters tested but has the disadvantage that the efficiency cannot be increased by decreasing the delivery. This is due to the fact that the filtering effect is accomplished by the scrubbing of the air as the air direction is changed. If the delivery is decreased the velocity through the filter is decreased and the scrubbing effect is lost. Group "E" included filters of dry all-wool and part-wool felts. The efficiency of this media is good but the patient may be allergic to the wool itself, thus eliminating this media for some cases of hayfever.

The efficiencies of the various filters tested seem to indicate, see accompanying table, that all of the filters except those of group "C" are acceptable for the purposes of removing the cedar pollen. However, in the opinion of the authors the

(Continued on page 122)

TYPICAL DATA AND RESULTS OF TESTS ON COMMERCIAL MECHANICAL AIR-FILTERS FOR THE REMOVAL OF CEDAR POLLEN

FILTER GROUP	A	B	C	D	E
Date tested (1938).....	Mar. 23	April 4	April 5	April 7	April 8
Time of start.....	1:30 pm	1:00 pm	1:00 pm	2:00 pm	2:00 pm
Length of run (minutes).....	75	75	75	75	75
Filter resistance (in. of water).....	0.08	0.13	0.16	0.125	0.18
Pitot tube (in. of water).....	0.065	0.065	0.065	0.065	0.065
Delivery (cu. ft. per min.).....	800	800	800	800	800
Filter area (sq. in.).....	4000	400	650	400	4000
Filter air delivery (cfm. per sq.in.).....	0.2	2.0	1.23	2.0	0.2
Air velocity through filter (ft. per min.).....	28	288	177.1	288	28
Pollen injection rate (grams per min.).....	0.005	0.005	0.005	0.005	0.005
Count before filter (grains pollen) cell* 1.....	72	40	31	36	64
Count before filter (grains pollen) cell* 2.....	67	24	32	34	68
Average per count (grains pollen/count).....	13.9	6.4	6.3	7.0	13.2
Count after filter (grains pollen) cell* 3.....	13	3	9	5	8
Count after filter (grains pollen) cell* 4.....	7	6	11	6	12
Average per count (grains pollen/count).....	2.0	0.9	2.0	1.1	2.0
Microscope constant.....	20	20	20	20	20
Pollen concentration before (grains/cu. ft.).....	278.0	128.0	126.0	140.0	264.0
Pollen concentration after (grains/cu. ft.).....	40.0	18.0	40.0	22.0	40.0
Efficiency (per cent).....	85.5	86.0	68.3	84.3	84.8

\*Sedgwick-Rafter counting cells, as described in "Quantification of Impinger Pollen Sample" paragraph.

\*Engineering Research Series No. 31. The University of Texas, Bureau of Engineering Research. Edited and reprinted by permission.



Left—Auditorium showing two 36 by 12-inch registers throwing to the rear and the rostrum in which two return faces are located. Compare with auditorium plan following. Below—Exterior showing ground level assembly hall and auditorium above.

## Church Heating System—



### *Zoned to Heat Only Spaces Immediately Occupied*

THE winter air conditioning system in the Cazenovia Park Baptist Church, Buffalo, New York, makes an interesting study because there is incorporated in the system practically every development in modern mechanical warm air heating.

The heating system was designed by C. H. Lighthart and installed by H. A. Ruff, Inc., both of Buffalo.

The modern aspects of the system can be summarized—the 850,000 Btu capacity steel furnace is gas-fired for freedom from firing. The gas burners are arranged in three stages so that heat input can be varied automatically in accordance with temperature requirements. The warm air distributing system is zoned so that areas in use can be heated without heating the entire building. Air supply and return use the latest type of faces so that air is introduced and guided where needed. All returns can be shut off, the blower

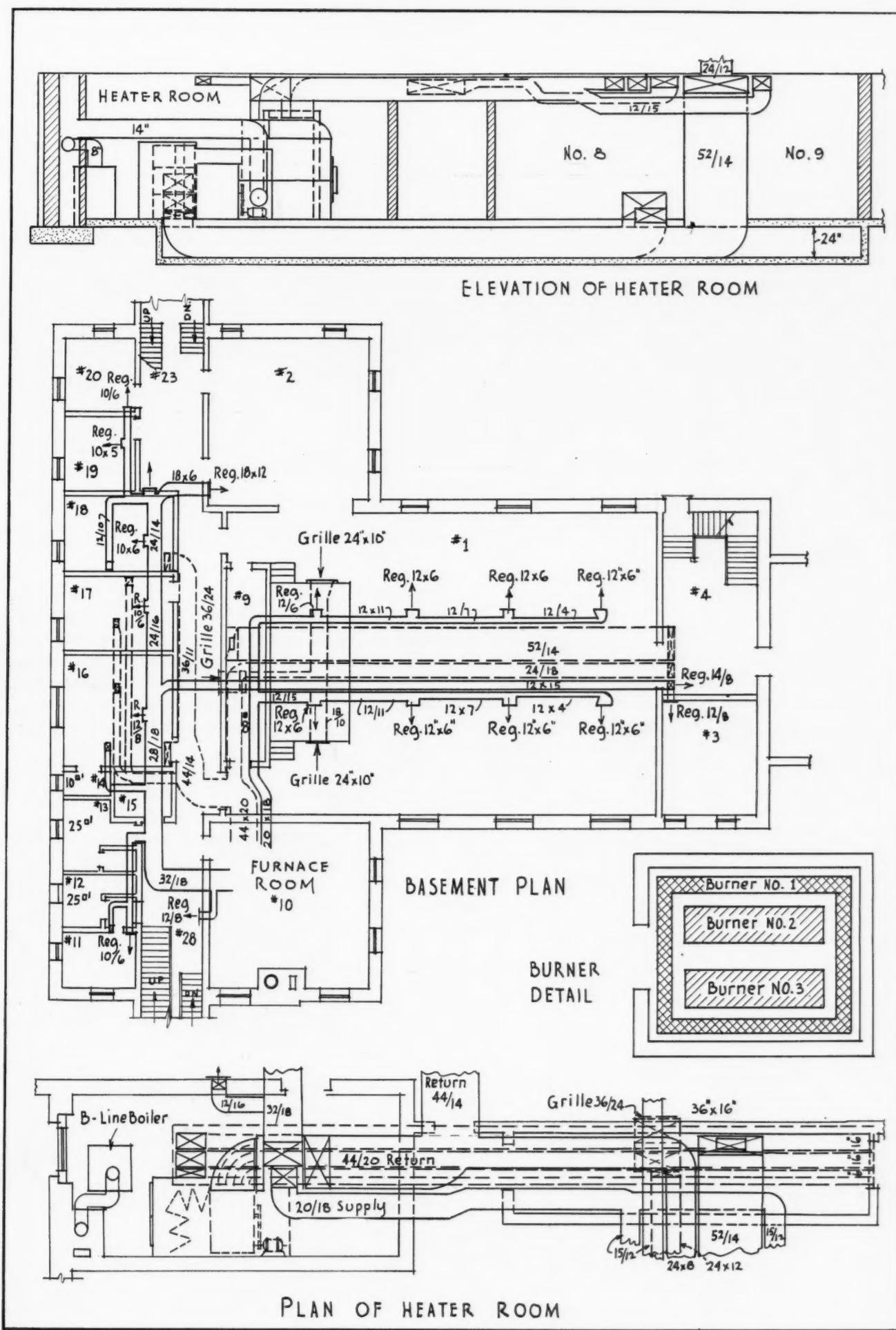
housing opened to the basement and air circulation used for summer ventilation.

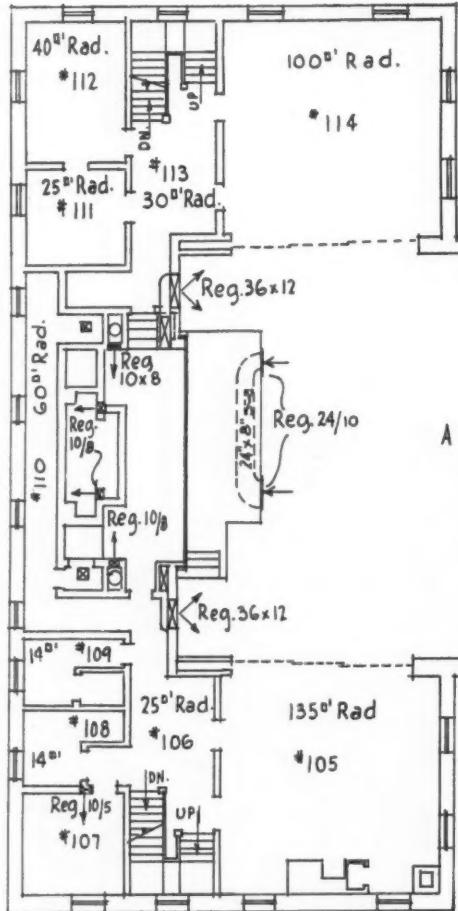
To accomplish these results, the control system is unusually complete and employs ideas not ordinarily associated with small and medium sized public buildings. The control system is, in fact, the most interesting feature of the installation.

The building, with spaces heated, is shown in the plans and details. There is a basement or ground level with assembly hall, service rooms, several small special rooms; a first floor with main auditorium, Sunday school rooms, service rooms and balcony; a second floor divided into small rooms for special service.

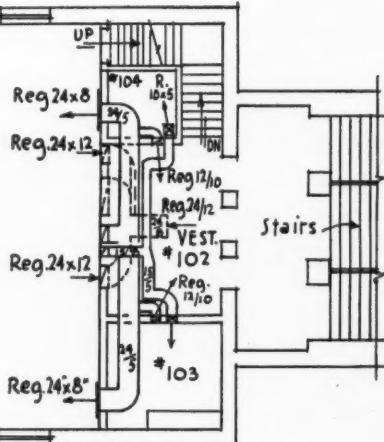
As the plans show, some of the small rooms are heated by radiation supplied from a boiler moved from the old church. But all major spaces are warm air heated.

As zoned for heating, zone 1 supplies the ground level assembly hall and adjacent small





#101  
AUDITORIUM



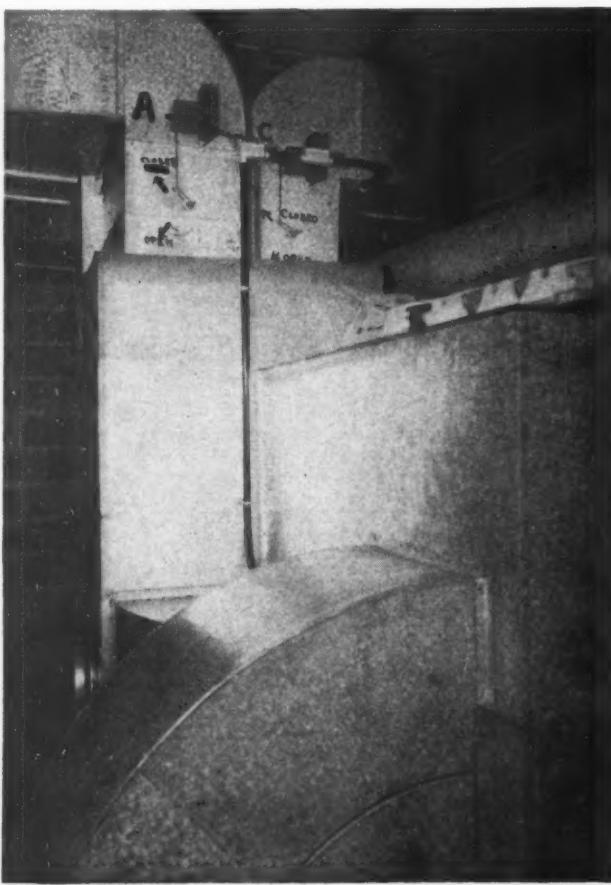
Plan of auditorium showing front and rear warm air supplies; front and rear returns; heated vestibule and small rooms—some warm air heated and some radiator heated. Directly behind rostrum is the baptismal font heated with two registers.

### FIRST FLOOR PLAN

Registers, throughout the building, are in the side walls, approximately one foot below the ceilings and connect with branch pipes as near the branch as possible to reduce the length of pipes. Returns are not placed in the numerous small rooms, but air is vented from these rooms through doors into corridors where return grilles are located.

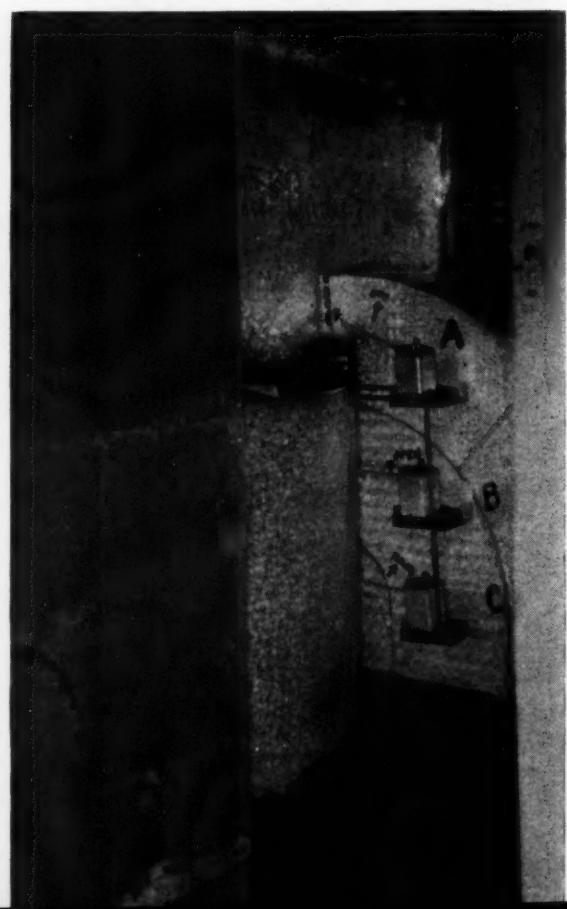
The two critical rooms, of course, are the auditorium and the large assembly room. The as-

service rooms; zone two supplies the main auditorium and small rooms adjacent, also the balcony; zone 3 supplies all small rooms not on the other two zones. The zoning, as the details and photographs show, is handled by separate piping directly off the low plenum. From the furnace room the zone pipes run as shown in the plans.



Left—Warm air plenum showing the three zone mains and two of the damper motors. The heater room plan and elevation on preceding page show details of pipe arrangement.

Right—In this system only the return from the zone calling for heat is open; the other returns are shut off by the damper motors shown. Thus the full capacity of the furnace and the blower may be directed to one zone for quick warming up. In summer all returns can be closed and the blower opened to the basement for ventilation.



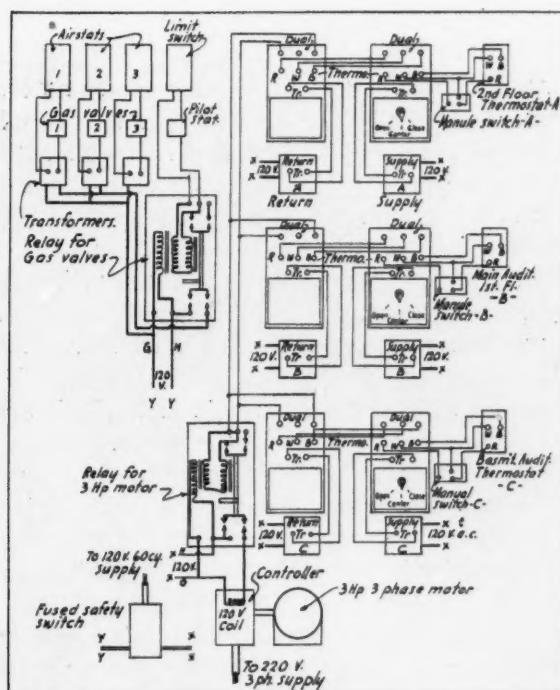
sembly room is heated from eight registers located along the two 15x12-inch ducts which, with two returns between, form a wide false beam along the supporting beam down the center of the room (see plan). Air is taken out of this room through two grilles located one on each side of the raised rostrum.

#### Heating the Auditorium

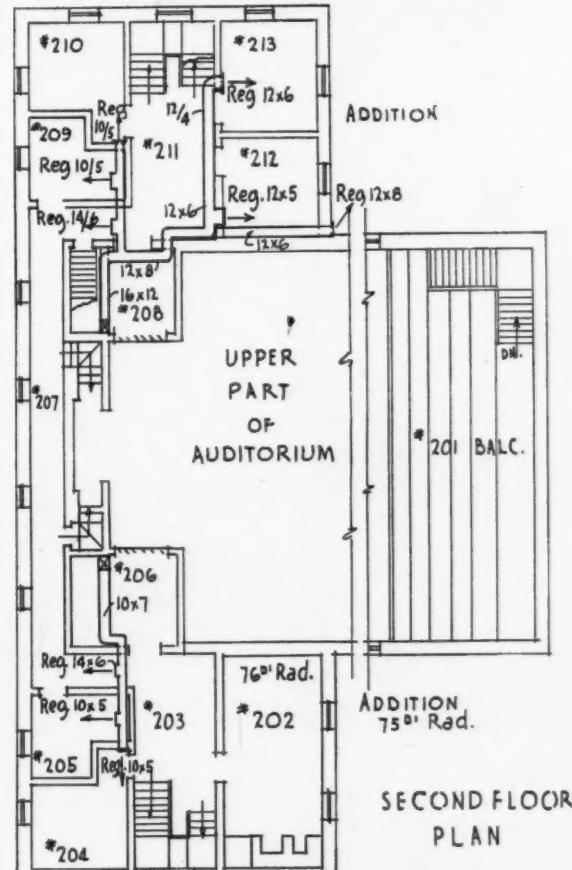
The main auditorium (see photograph) is two stories high with a flat arc ceiling. The rostrum, pulpit and baptismal font are shown in the photograph which was taken from the balcony facing the pulpit. Warm air for the auditorium is introduced through the two large registers on each side of the rostrum and through two slightly smaller registers in the rear wall, beneath the balcony. Directional faces are used to sweep air along both side walls and evenly distribute the air across the center. Also velocities are used to bring the air streams from front and back together in the center. The air streams, so far as possible are kept at register level so that mixing is effected just above the congregation's head. The upper layer is disturbed as little as possible.

Air is returned from the auditorium through two large grilles in the balcony wall and through two grilles in the forward face of the rostrum (see plan).

It should be noted on the plan that warm air is introduced into the entrance foyer and cold air removed so that outside air does not reach the auditorium.



Wiring diagram of the installation showing wiring between zone damper motors, return damper motors, gas valve to three burners and the fan motor.



Second floor rooms in wings are heated as shown above. The balcony has no heat supply; auditorium upper level air being depended upon for warmth.

#### The Control System

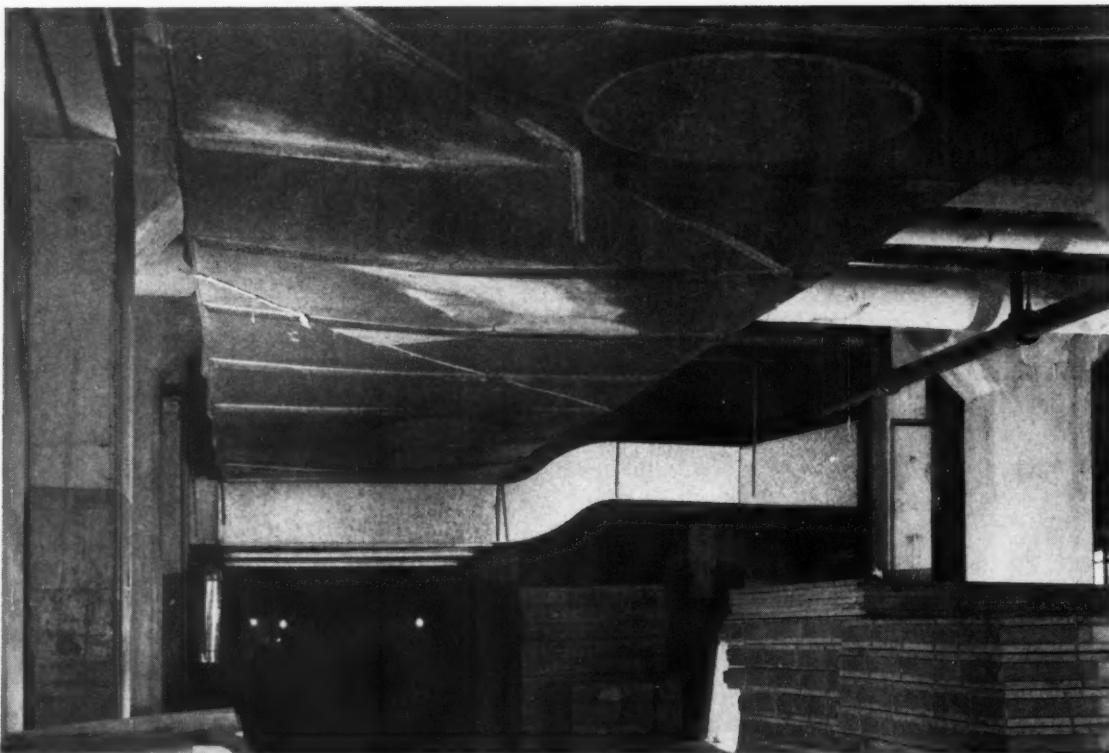
The most interesting feature of the system is the operating sequences and the control system. Each zone has its own thermostat. Also, return air from each zone is brought back to the furnace room separately and at the blower (see photo) a damper in each return line functions automatically with the warm air zone damper or can be opened or closed manually for summer ventilation.

Whenever a zone calls for heat the zone damper is opened by the thermostat. Each zone damper has a built-in switch which starts the blower whenever any zone opens. By this arrangement the blower starts whenever a zone damper opens, regardless of bonnet temperature. This arrangement was adopted in order to provide a measure of extra ventilation and to clear the pipes quickly.

Each zone thermostat is given current through a manual zone switch so that if heat is wanted in only one zone the other two can be made inoperative. All three zone manual switches are, in turn, made operative by one central master switch which can cut off all operations.

Whenever a warm air zone damper opens, the return air damper for that zone (see photo) also opens so that recirculation is completed in that

(Continued on page 116)



The difference between the lower section of ductwork (installed by us) and the upper section (installed previously by a competitor) needs no further explaining. Pictures will impress most prospects.

## Getting the Order is Easy, If—

By Henriette T. Betlem  
Betlem Heating Co., Rochester, N. Y.

**G**ETTING the order is the most important part of any business.

However, when all the groundwork is properly laid this should be comparatively simple. A prospect should not be carried to this stage unless it is fairly certain he is *going to buy now* and is not prejudiced against your equipment or has a friend from whom he'd buy no matter what his price or equipment was.

Selling is a battle of wits. Anticipating the buyer's objections and minimizing them in your own words removes one of his strongest weapons. If he is going to buy and agrees with you on every score, you've sold a job.

We assume, at this stage, that the prospect has been qualified to the extent that he is in the market for air conditioning equipment—now—the only step that remains is to convince him that he should buy *your* equipment. Who is a more logical man for the task than the engineer who knows his equipment thoroughly?

I find that the hardest type of person to sell

is the man "who won't talk." He makes no comments on any of your carefully presented sales angles, he asks no questions, and shows no enthusiasm whatsoever. Somehow or other he must be induced to express his viewpoints. The more questions he will ask, the easier it is to sell him. But sometimes your patience will be sorely tried in getting him to talk. It may be a discussion on the weather, or his daughter's picture on his desk, or a fishing trip in the offing. But, asking him point blank if he is interested in making his business show a profit would be the proper approach.

A little human understanding goes a long way in drawing people out. So, if your engineer is no student of human nature, have him take a course in psychology in addition to that course in salesmanship.

An accurate analysis of the buyer's needs and also the proof that you can supply these needs is the surest way toward making the sale. Getting the order should be such a small part of this entire transaction that it is difficult to write exten-

sively on this one topic alone. I would simply stress again the absolute necessity of effective surveying, a thorough understanding of the requirements and a list of successful jobs where promises were made to the buyer and kept.

#### Leading Up to the Order

I do all my own engineering for my prospective customers. When the job reaches the closing stage, there is not much left to say—so, I ask for the order. On one particular account, after all the preliminary work had been completed, I walked into the store one day and asked the owner for the order. He said, "Isn't your price rather high?" And I replied that it wasn't. Then he stated that he didn't think he really needed air conditioning. I said he did—at which statement he asked for a pen to sign the order. This man was one in a million, I'm sure. It usually takes longer than ten minutes to conclude this very important part of the transaction. But, in reality, there should not be much more to say.

On another occasion, we had made a survey for a funeral establishment the previous year. The owner called me over one day saying he had decided to consider the proposition again. This man had a 34 ft. cabin cruiser for sale, for which he was asking exactly what I wanted for the air conditioning system. I asked him if he would make an even exchange and within five minutes I returned to the office, a proud yachtsman—with a boat. We had immediate possession while he waited three weeks for his installation.

I don't recommend the barter system to get business, but in this case, everyone was happy.



The air conditioning unit is concealed back of the partition and finished off in the same material as the adjacent space. Most prospective customers are highly concerned with the appearance of the finished installation, so a good photograph makes selling easier.

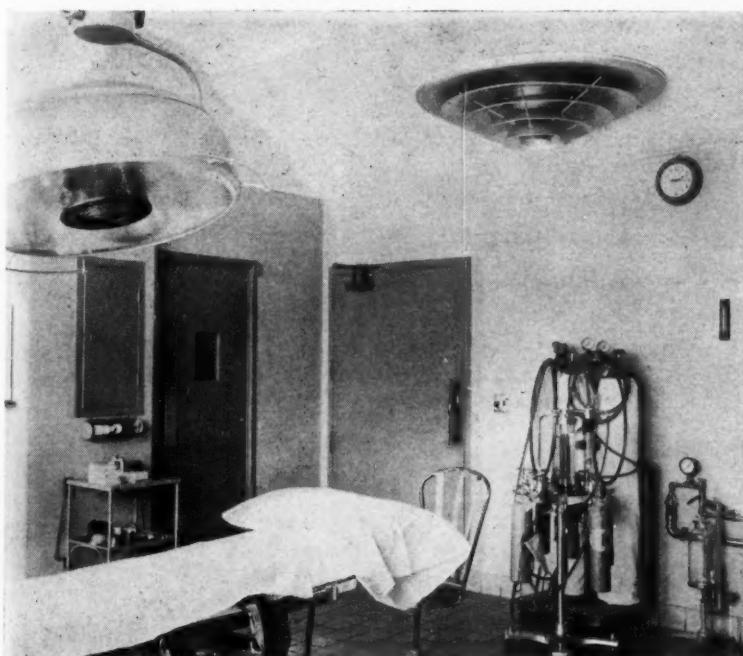
One effective way of dramatizing a sale is the use of photographs of your installations. Especially pictures of such places where it would not be convenient to take the prospect.

A photo shown here demonstrates the difference between ductwork installed by our sheet metal department and that of a competitive organization on some previous installation. Nothing need be said about the ductwork above ours, but we can say, "This is what our work looks like."

In another, we show how inconspicuously an air conditioning unit and ductwork can be installed in an existing building. And, sometimes, we use the type of picture which has no direct bearing upon the sale at hand, but impresses on the prospect's mind our ability to perform difficult jobs such as the one of the hospital operating room where 1,000 ft. of air is discharged directly over the operating table without causing dangerous drafts.

Always keeping in mind that we are selling to make a profit, we should never close a sale without a definite understanding of just what is to be done for the contract price and a specific statement in this contract as to terms.

If collections are not possible because of a poorly written contract—or if the terms have not been clearly stated, your business is not operating at its greatest efficiency and you are—through a few moments negligence—losing that very money that you have spent all this time trying to acquire.



Photographs such as these have dramatic appeal. Impress your prospects with your ability to perform the most difficult installation.

# 1,000 Winter Air Conditioning Systems

By R. C. Nason

ALTHOUGH a sheet metal contractor in Jamaica, L. I., since 1912, it was not until 1938 that Joseph Weinstein, whose business is known as Jowein, Inc., began to make air conditioning a prime objective. Since January of that year, however, this contractor has sold and installed in his local territory approximately 1,000 plants. No single success formula applies, but his growth can be attributed to keeping in close touch with speculative builders. By convincing the leader, competitive developers fell into line. Now at least four prominent builders, whose homes range from \$9,000 to \$20,000 in selling price, have adopted forced-air heating and find that buildings thus equipped sell faster than homes heated by steam and hot water.

In 1938, Jowein, Inc., sold and installed in "Strathmore," a high class residential development financed and managed by Levitt & Sons, in Manhasset, L. I., 205 warm air conditioning plants all fueled with either oil or gas. So successful was this development with homes ranging from \$8,500 to \$20,000 that the same developer greatly increased activities in 1939 and 1940.

Some 1,000 dwellings have either been built and sold by them or are in process of construction at this time. The majority of the houses will be or are heated with oil and warm air is the general method. Jowein, Inc., has made all the heating installations thus far and, barring accident, expects to handle the full contract.

## Overcoming Builders' Skepticism

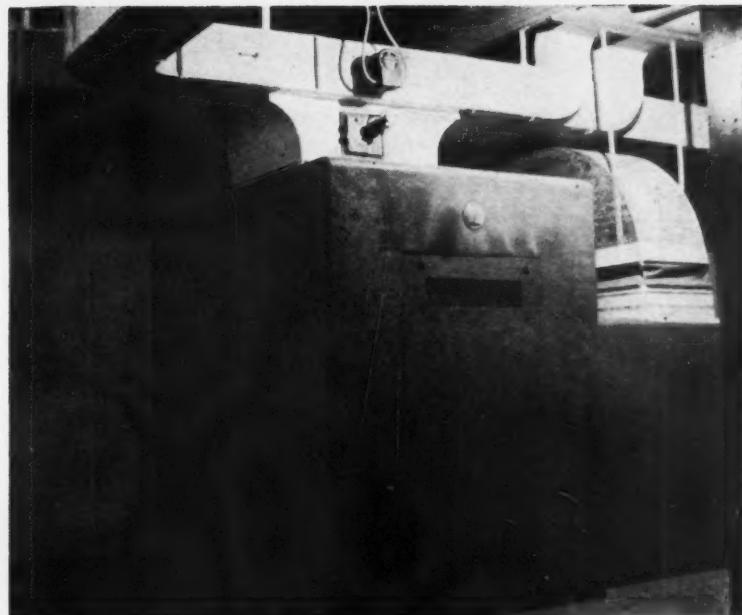
Competitive builders were admittedly skeptical of warm air for speculative homes of the class indicated. But when Levitt & Sons found air-conditioned homes sold readily and for slightly more than those equipped with other types of heating, one by one they have climbed aboard the band wagon. At this writing the aforesaid sheet metal contractor has 160 orders on his books for air conditioning in residences in this locality during the current year. Unquestionably the back-order file will be increased because developers in this area have begun to specify air conditioning and will adopt this method for hundreds of homes erected in this area during the current year.

Analyzing success factors that brought Jowein,



Shop of Jowein, Inc., where winter air conditioning ducts and fittings are fabricated on a large scale. Adoption of modern machine equipment (note lock forming machine in center) keeps metal work costs reasonable.

# Installed Since 1938



Above—Typical Jowein winter air conditioning installation in a \$10,000 house. Meticulous duct work and attention to small details of appearance and operation maintain builders' respect. At left—Exterior of Jowein establishment.

Inc., into the local spotlight, it appears that the following points predominate:

1. Cultivation of building contractors;
2. Attractive appearance of installations as presented to the eyes of prospective homeowners;
3. Help of prominent and widely publicized developer who did the thing competitors said he couldn't do;
4. Adequacy of sheet metal crew in the field and in the shop to handle projects involving 50 homes monthly;
5. Good engineering and workability of plants when heat was turned on and with a minimum of balancing;
6. Fairness of prices asked by sheet metal contractor;
7. Ready compliance in regard to service demands as requested.

#### Desk Pad Reminders

Elaborating on the foregoing, as stated both by Mr. Weinstein and his chief engineer and superintendent of installation, Charles Meyer, the sheet metal contractor's cultivation of building developers involves personal contacts, frequent focusing of attention through the free distribution of advertising desk calendars and scratch pads. Both bear the name and address of Jowein,

Inc., and the scope of the sheet metal work sought by the contractor. "Be friendly," trite as the saying is, "continues to pay dividends," advised Mr. Weinstein.

#### Installation Features

Examination of several installations reveals a few factors that must have helped in connection with work appearance. First, oil-fired plants are set on low concrete foundations. Second, dampers in all branches. Third, covering all exposed warm-air ducts with 12-oz. asbestos paper faultlessly pasted on. Fourth, taping of all joints with 12-oz asbestos tape, applied in the same manner. Fifth, running of almost all basement ducts in joist spaces. Sixth, canvas connections between sheet metal work and equipment. Seventh, exterior fuel tanks. Finally, the use of well-engineered riser connections. This in contrast to the often-seen ill-fitting connections that obviously were not designed for the job on hand, but were used because they happened to be in stock.

From a merchandising standpoint it appears that if one wishes to enter the exacting circle of speculative building on a broad scale, one should first obtain orders from one or more leading building contractors. Then competitors follow the leader. In the Jowein instance, the fallacy that warm air is inferior definitely has been shattered

and, it is hoped, for all time. Builders hereabouts pay Jowein slightly more than they could have purchased 1-pipe steam heating for and do not mind a bit because "air conditionning" by forced-air has been found to possess distinct advantages when developers seek to make sales.

Coping with residential developments that may and do involve 50 air conditioning installations monthly, as has been true of the Jowein business in the last two years and will be during 1940, is somewhat different than sheet metal work involving a fewer number of installations. Both adequate shop tooling and a good outside crew are essential. Most of the Jowein ducts and fittings are made quickly by a Pittsburgh machine. The summer crew in the field in summer numbers 40.

#### Engineering Is Thorough

Another factor that has contributed to the success of this sheet metal contractor is the application of sound engineering in sizing and arrangement of ducts, grilles, returns. Mr. Meyer, the engineer, recognizes the importance of precisionness as to dimensioning and tightness of joints. There must be none of the tiny leaks that characterize much air conditioning sheet metal workmanship. Due to care *before* installation rather than *afterwards*, most Jowein air conditioning installations work well enough without balancing. A thorough check on all jobs is, however, made.

Balancing rarely requires more than an hour or so.

### JOWEIN, Inc.

150-17 LIBERTY AVENUE

Jamaica 6-1684

Jamaica, N. Y.



**REGULAR AND SPECIAL DUCTS  
MADE TO ORDER**

SHEET METAL WORK IN ALL ITS BRANCHES  
Telephone Jamaica 6-1684

AIR CONDITIONING  
Our Specialty

SHEET METAL WORK  
In all its branches

Regular and special ducts made to order

**JOWEIN, Inc.**

150-17 Liberty Avenue, Jamaica, N. Y.

Jamaica 6-1684

Jamaica 6-1026

Thursday January 5

Friday January 6

Saturday January 7

Sunday January 8

Desk calendars for important notations and scratch pads are distributed liberally to all who may buy or influence the purchase of air conditioning systems. The calendar above measures  $4\frac{3}{4}$  by  $7\frac{1}{2}$  inches. The pad below measures 5 by  $8\frac{1}{2}$  inches.

#### Duct Fabrication and Prices

Making up ducts and fittings on an extended scale, plus ability to work full crews at one location, has enabled the sheet metal contractor to price his work fairly and reasonably. In pricing, however, there is no "slap" estimating wherein competitive price-per-opening is the sole basis for estimating. Prices are arranged according to the type of openings as well as types of construction, plus building shapes. A square bungalow, for example, may be priced at \$14.00 per opening, the lowest ever used by Jowein, or may, on the other hand, be priced at \$35.00 per opening, usually the maximum. Somewhere in between the two figures represents the average. The differences are due to variations in construction.

A square bungalow, fully excavated, usually takes the lowest price. But if not fully excavated,  
(Continued on page 128)

# Pattern for a Double Offset Fitting\* [Part 1]

*Whose Central Line Projects to the Right and Leans Forward While the Circular Opening is at Right Angles to the True Central Line*

By William Neubecker

Head Instructor

Sheet Metal Department, New York Trade School

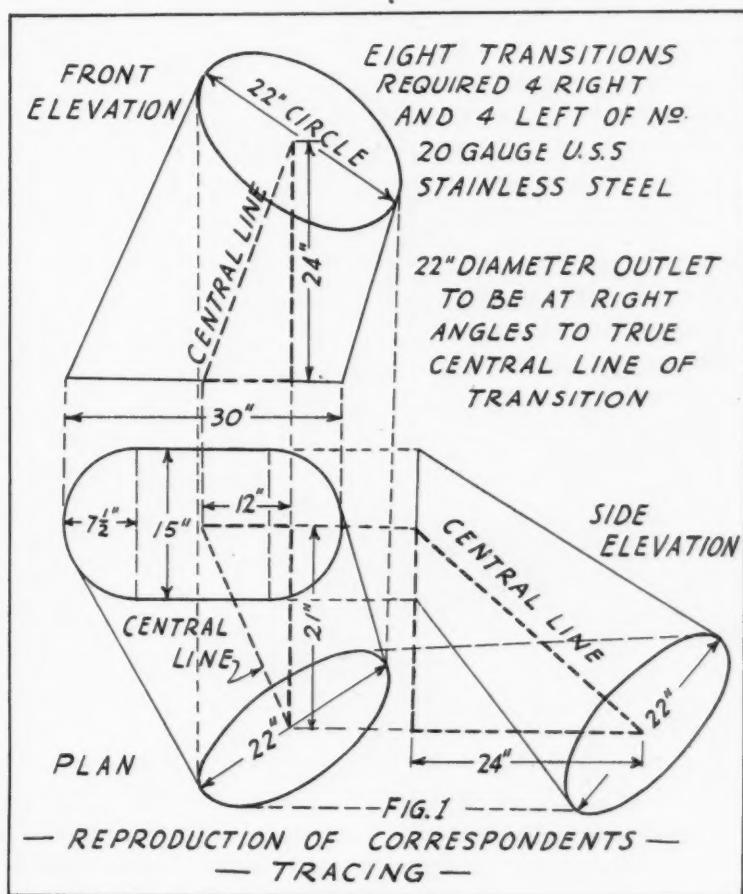
A CORRESPONDENT from Jamaica, N. Y. writes as follows: "Enclosed find a tracing taken from our engineer's blue print of a transition from oblong (with semi-circular ends) to round. I cannot find any problem similar to this in Neubecker's series on fittings now running in the AMERICAN ARTISAN. This is a double offset fitting whose *central* line projects 12 inches to the right and leans toward the reader a distance of 21 inches. The circular outlet at the top is to be at a *right angle* to the true *central* line of the transition. As none of the *central* lines in either plan or elevations show their true lengths, how can this *true central* line be found and how are the elliptical outlines projected in the plan and elevations. An explanation of the principles involved will be appreciated in your valuable journal, which is the only trade paper we can appeal to, which gives clear concise drawings easily understood and read."

Fig. 1 shows a reproduction of our correspondents tracing showing the plan, front and side elevations. The inset section at the base is 30 inches long by 15 inches wide with semi-circular ends. The outlet at the top is to be a true circle 22 inches in diameter. The transition has a double offset, projecting from the *central* point of the base a distance of 12 inches to the right and projects toward the reader a distance of 21 inches as shown in the plan view in Fig. 1. The vertical distance from the base line to the center point of the round top outlet is 24 inches, as shown in both front and side elevations.

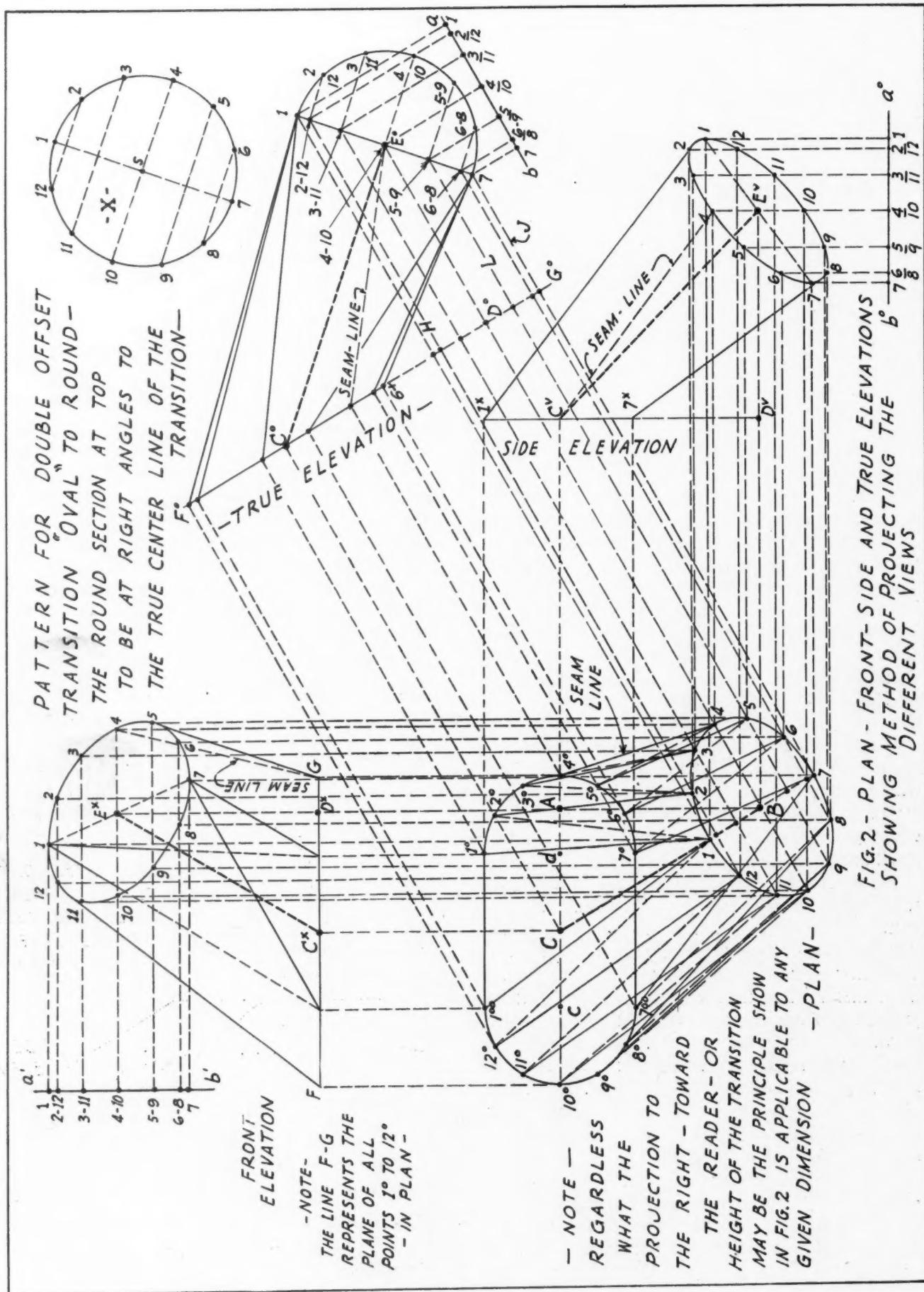
This problem presents an interesting study in projections, intersections and triangulation. In this connection it may be proper to say that the front and side elevations are not necessary in developing the pattern shape. All that is required

is the plan view and the true elevation. It should be understood that regardless of what shapes the base and top may have or what projection to the right; toward the reader or height that the transition may have, the principle which will be described as we proceed is applicable to any given shapes or dimensions.

Although the front and side elevations are not necessary in laying out the pattern shape, the method of projecting these two views will also be shown as requested by our correspondent.



\*All rights reserved.



### Drawing Proper Plan and True Elevation

In Fig. 2 first draw the plan of the base whose semi-circular ends are struck from the centers *c* and *d*. Find the central point of this base as indicated by *C* through which draw the center line  $4^{\circ}-10^{\circ}$ . Set off on this line the desired projection to the right as shown by *C-A* also the desired projection toward the reader as indicated by *A-B*.

*B* then represents the center of the circular outlet at the top, when viewed in plan.

Draw the heavy dotted line from *B* to *C* which represents the *central line* of the transition when viewed in plan.

The next step is to find the *true length* of this central line as follows: Parallel to the line *B-C* in plan draw any line as shown by *F<sup>o</sup>-G<sup>o</sup>*. From point *C* in plan erect the perpendicular line *C-C<sup>o</sup>* to intersect the line *F<sup>o</sup>-G<sup>o</sup>* at *C<sup>o</sup>*. From the point *B* in plan erect the perpendicular line *B-E<sup>o</sup>* crossing the line *F<sup>o</sup>-G<sup>o</sup>* at *D<sup>o</sup>* and make *D<sup>o</sup>-E<sup>o</sup>* equal to the desired height of the transition.

Draw the heavy dotted line from *C<sup>o</sup>* to *E<sup>o</sup>* which will be the *true length* of the central line shown by *B-C* in plan. At right angles to the true central line *C<sup>o</sup>-E<sup>o</sup>* draw the line *1-7* equal to the given diameter of the round outlet, placing the semi-diameters on either side of the center point *E<sup>o</sup>* on the line *1-7*. With *E<sup>o</sup>* as center describe the semi-circle shown. For want of space the semi-circle has been drawn direct on the line *1-7*.

Divide the semi-circle in any desired number of parts, in this case six. Note that each division represents two numbers as *2-12*, *3-11*, *4-10*, etc. This is made clear by referring to the full circle *X* above. Through the center point *S* draw the line *1-7* parallel to *1-7* in *E<sup>o</sup>*. Now divide the full circle *X* into twice the number of divisions contained in the semi-circle *E<sup>o</sup>*. In circle *X* draw lines connecting opposite numbers as *2* to *12*, *3* to *11*, *4* to *10*, etc., which will be at right angles to the line *1-7*. Then note that point *12* will be in line with *2*; *11* with *3*; *10* with *4*; *9* with *5* and *8* with *6*.

Now place these double numbers on the divisions in the semi-circle in *E<sup>o</sup>* and at right angles to *1-7* from the double numbered division draw lines to intersect the line *1-7* as shown by similar double numbers.

As the pattern will be solved by triangulation, space each semi-circle in plan also in six divisions as shown from  $1^{\circ}$  to  $7^{\circ}$  and  $7^{\circ}$  to  $1^{\circ}$  similar to the number of the divisions in the semi-circle in *E<sup>o</sup>* in the true elevation. From the point  $12^{\circ}$  in plan draw a line at right angle to *B-C* to intersect the line *F<sup>o</sup>-G<sup>o</sup>* at *F<sup>o</sup>*. In a similar manner from  $6^{\circ}$  in plan, erect a line at right angles to *B-C* to intersect the line *F<sup>o</sup>-G<sup>o</sup>* at *6<sup>x</sup>*. Draw a line from *1* in the semi-section *E<sup>o</sup>* to *F<sup>o</sup>* and from *7* in the semi-section *E<sup>o</sup>* to *6<sup>x</sup>*. Then

will *1-F<sup>o</sup>-6<sup>x</sup>-7* be the true elevation of the transition.

To obtain a true plan view of the circular top on the line *1-7* in the true elevation, proceed as follows: From the various intersections on the line *1-7* in true elevation, at right angles to *F<sup>o</sup>-G<sup>o</sup>*, draw lines indefinitely in the plan as shown. Now extend the center line *C-B* in plan to intersect the line drawn from *7* in the true elevation, at *7* in plan. Measuring in each instance from the line *1-7* in true elevation take the various distances to points *2-12* to *6-8* in the semi-circle and set them off on either side of the line *C-7* in plan, on similar numbered lines previously drawn from the various intersections on the line *1-7* in the true elevation.

For example: Measuring from the line *1-7* in the true elevation, take the distance to the division marked *2-12* in the semi-circle and set off this distance in plan measuring in every instance from and on either side of the line *C-7* on similar numbered lines previously drawn, thus obtaining points *2* and *12*. Again take the distance from the line *1-7* in the true elevation to the division marked *5-9* in the semi-circle and set it off on either side of the center line *C-7* in plan on lines previously drawn from *5-9* in the true elevation and in this manner obtain the intersection *5* and *9* in plan. In this manner all of the points *1* to *12* in plan are obtained.

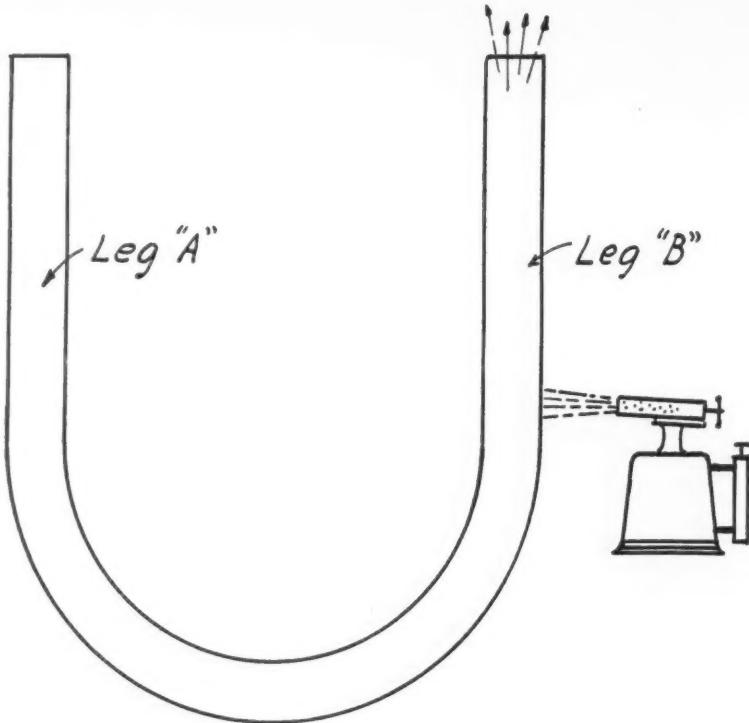
Trace the elliptical outline through points so obtained to represent the true plan view of the top outlet *1-7* in the true elevation. This plan view and true elevation are all that is required in laying out the pattern for the transition piece. To draft the true front and side elevations of the transition as requested by our correspondent the following rules must be observed.

### Drafting True Front and Side Elevations

At right angles to *F<sup>o</sup>-G<sup>o</sup>* in the true elevation draw any line as *a-b*. At right angles to *a-b* from the various intersections on the line *1-7* draw lines to intersect *a-b* as shown by similar numbers.

To draw the true front elevation draw any line above the plan parallel to  $4^{\circ}-10^{\circ}$  in plan as shown by *F-G*. From points  $4^{\circ}$  and  $10^{\circ}$  in plan erect perpendicular lines to intersect the line *F-G* at *F* and *G*. Now take the *vertical height* of the transition in the true elevation indicated by *D<sup>o</sup>-E<sup>o</sup>* and set it off on the line erected from *A* in plan (the projection to the right) as shown in the front elevation from *D<sup>x</sup>* to *E<sup>x</sup>*. Erect a line from the center point *C* in plan to meet the base line *F-G* at *C<sup>x</sup>* and draw the heavy dotted line from *C<sup>x</sup>* to *E<sup>x</sup>* which represents the central line on the line *C-B* in plan. From *E<sup>x</sup>* in front elevation, draw a line to the left parallel to *F-G* to intersect

(Continued on page 130)



*Fig. 1*

# CHIMNEYS\*

*Particularly chimneys  
for domestic oil-fired  
heating plants*

By W. O. Lum  
Consulting Engineer,  
Air Conditioning and Commercial Refrigeration  
Department,  
General Electric Company

## [Part 1]

IT has been said that perhaps the first chimney used by man was some sort of duct contrivance to remove the smoke from his living quarters. It was probably the invention of some partially civilized individual, for certainly the American Indian and the Eskimo knew nothing of chimneys. It is probable that the first users of chimneys discovered that when they are built in certain ways a better fire can be had. Some of us who have the job of correcting elementary errors in the use of chimneys suspect that the great majority of modern men still look upon the chimney as something to keep smoke and smell out of the house.

### Chimney Fundamentals

The fundamental principles which determine the performance of any chimney are exceedingly simple and yet, in my experience, I have encountered a surprisingly large number of people who have neglected to connect these simple physical laws with the ordinary household chimney. Perhaps the easiest way to translate these natural laws into terms of chimney performance is by illustration.

Charles law of gases states that "the volume of a gas, at constant pressure, increases in proportion to its absolute temperature."

Example: The absolute temperature of air at 70 deg. F. is  $460 + 70 = 530$  deg., absolute; raised to 600 deg. F. is

$460 + 600 = 1,060$  deg., absolute. The absolute temperature has been doubled—therefore the volume is doubled and the weight per cu. ft. is halved.

Consider a simple "U" tube, Fig. 1. Consider that this tube is filled to the top of both legs with a gas. We now know that when any gas is heated it expands, or, in other words, the gas occupying a given volume will weigh less when its temperature is raised. Now, looking again at the gas filled "U" tube—suppose we raise the temperature of the gas in leg "B," thus expanding it. The excess will be forced out of the top of the leg "B" because of the pressure exerted by the cooler, heavier gas in leg "A." This is what occurs in a chimney on a house when it functions properly. It is clear from this illustration that the heavy gases in leg "A" push the light gas in leg "B" out and over the top. In visualizing the action of a chimney, therefore, we are liable to become confused if we consider draft as suction, because, in the words of Bill Nye, "there ain't no such animal."

### Chimney Is a "U" Tube

To carry this illustration further—suppose we substitute for leg "A" of the "U" tube a house and for leg "B" a chimney (Fig. 2), and for the moment we shall omit the furnace. The bottom of the chimney flue is open into the house. Refer back now to the "U" tube illustration and it becomes perfectly clear that the direction of air flow in the chimney will depend upon the relative

\*Paper delivered to a group of oil burner dealers in New York City, Feb., 1940.

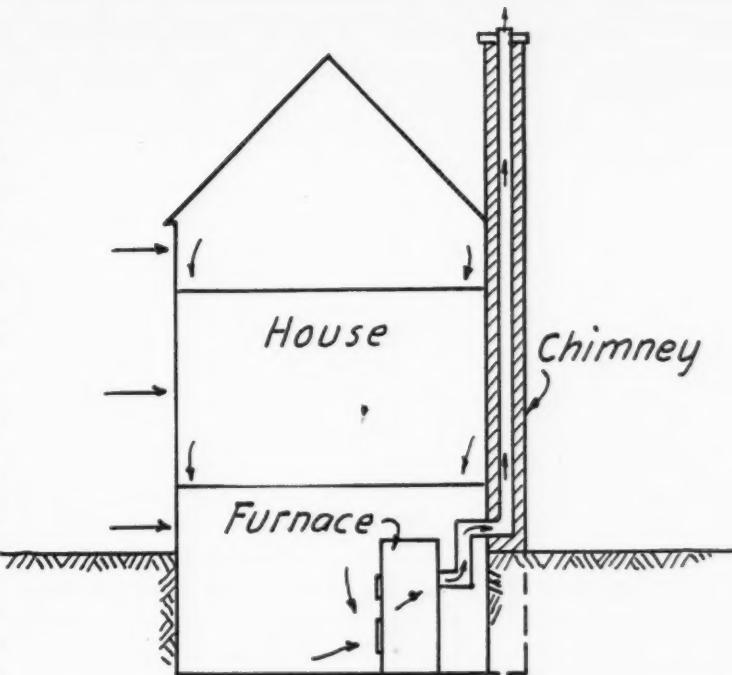
temperatures of the house air and the air column in the chimney. If the chimney is colder, the air will flow down the chimney into the house, up through the house and out. The reverse action can only occur when the air column in the chimney is lighter (warmer) than the air in the house. At this point it may be well to introduce the fact that at the same temperature the products of combustion from burning oil are approximately 3% heavier than air, and the two for ordinary analysis purposes may be considered of equal weight at equal temperatures.

Now, if we connect a boiler or furnace to the chimney flue (Fig. 3), we have in no way altered the conditions illustrated in Fig. 2, excepting that the gas flow between the chimney and the house in either direction must pass through the combustion chamber. This combustion chamber is ordinarily the source of heat by which the gas column in the chimney becomes lighter than the gas column in the house and, therefore, air flows through the furnace to supply the requirements of the combustion.

#### **Oil Burner Fan Creates Artificial Pressure**

It will immediately occur to most of you that in a large percentage of oil burning domestic heating equipment a fan is provided for delivering combustion air to the furnace and that, therefore, necessary pressure for creating gas flow up the chimney is available, regardless of the chimney. This is essentially true, but unless we have an airtight boiler or furnace and a completely airtight flue and chimney system, we shall be discharging products of combustion into the house whenever the chimney gases are not sufficiently warm. Airtight flue systems ordinarily do not exist and, therefore, it is exceedingly important that there be sufficient heat in the chimney gases at all times so that they are lighter than the air in the house.

At this point I should like to illustrate a condition that occasionally results in considerable an-



**Fig. 3**

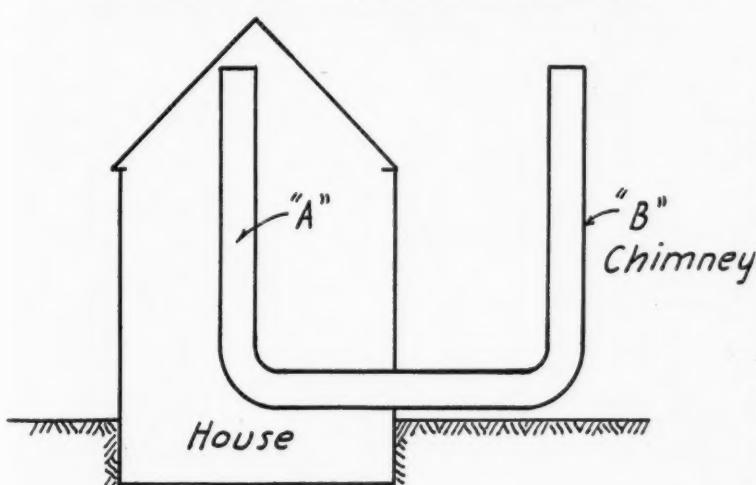
noyance. Refer to Fig. 3 and consider a direct oil-fired warm air conditioner, with an outside chimney on the shady side of the house and a sunny day. After the furnace has been off for a sufficient length of time for the chimney and the furnace to cool, a down or "back-draft" through the heating plant is unavoidable, because the heat from the sun will maintain the house temperature above the temperature of the chimney and cold outside air will flow down the chimney through the heating plant into the house. Under these conditions, oil-fired equipment will have difficulty in starting without discharging some of the products of combustion into the house during the warming-up period of the chimney. The conditions illustrated and described above exist during stand-by or off periods of the heating plant and frequently for brief intervals, each time the heating plant starts.

#### **Outside Temperature is Critical**

Neglecting for the moment the effect of wind upon poorly located chimneys, we find only one condition of weather which noticeably affects the performance of any given chimney. This is the outside air temperature, for while the furnace is in operation it is the temperature difference between the gas (air) in the chimney and the air outside which determines the pressure available to force air into and through the furnace.

The changes in weight of air due to conditions of humidity are negligible and need not be considered. To illustrate this: Air at 40 deg. F. and 50% R. H. weighs .0790 lb. per cu. ft. and at 100% R. H. its weight is .0787 lb. per cu. ft. At 600 deg. F. this same air will be half as heavy or approximately .0394 lb. per cu. ft. For the

(Continued on page 127)



**Fig. 2**

# Cooling a Suite of Industrial Offices

By E. R. Ross

Bevington-Williams, Inc., Indianapolis

INDUSTRIAL plants make an ideal customer for air-conditioning. In the normal plant there are usually a few private offices and a small general office, and these are ordinarily the first spots to be cooled. The person that an engineer contacts relative to a cooling job in an industrial plant is normally an engineer in his own right and much easier to reason with than the average store owner or purchaser of cooling equipment.

Following the customary procedure of a trip to the site, we arrive at the following:

1. Building description (as per plan, Figs. 1 and 2).
  - (a) Floor area,  $60' \times 35' = 2,100$  sq. ft. with 12'0" ceiling height.
  - (b) Utilities are available at most any location. Client has 53-degree well water available in large quantities, which he now uses for process cooling.
  - (c) Building is a one-story factory building

of brick construction, with the exception of the part where the offices are located. This particular section is two stories high, but still brick construction. The executive and general office space are located on the second floor above the factory.

- (d) The building proper faces south, but the offices have exposure from four sides, as well as the roof. The floor is also over a hot factory. The windows of the offices have awnings.
- (e) The office lighting is indirect and amounts to five watts per square foot, including desk lamps and small motors on adding machines, etc.
- (f) Occupancy-total, 25 employees.
- (g) There isn't any space available for equipment on the second floor, but the client is willing to give up sufficient factory

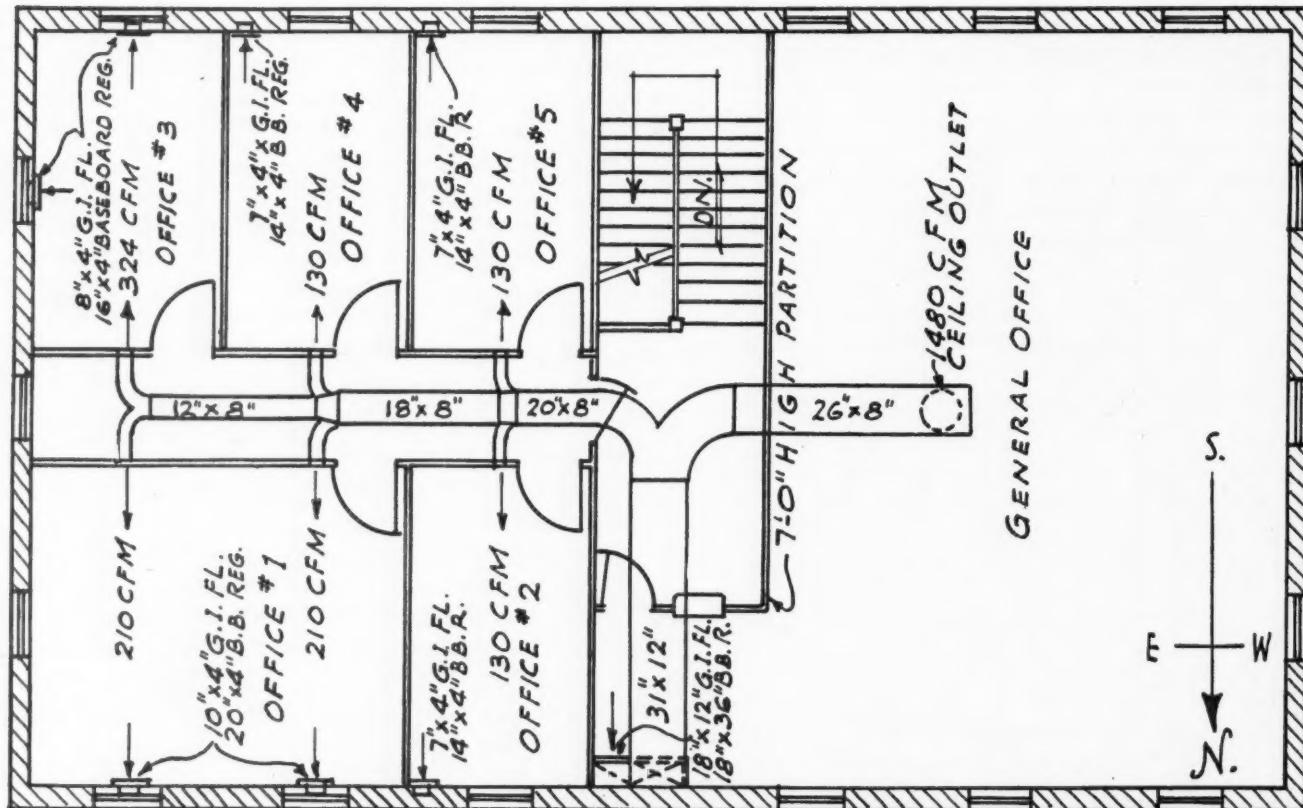
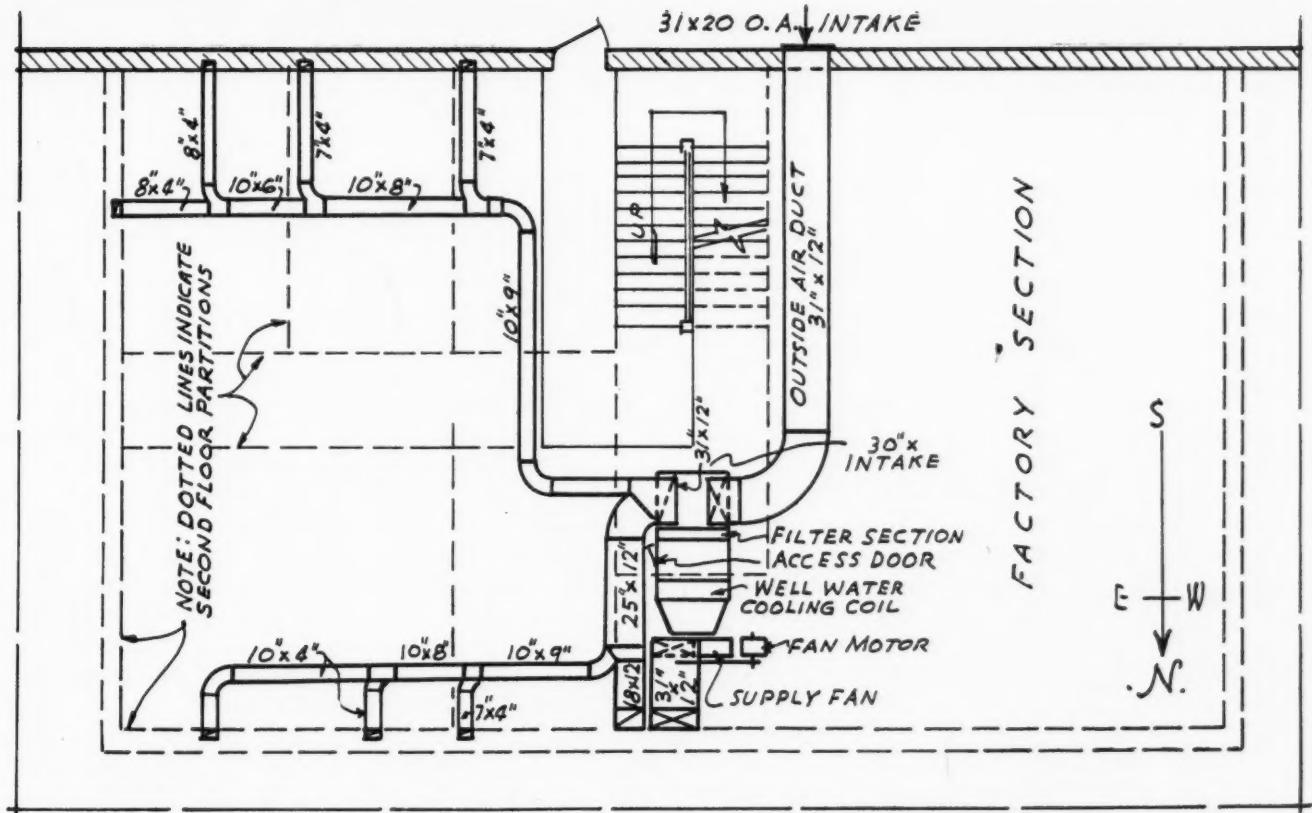


FIG. 1 SECOND FLOOR PLAN SHOWING OFFICE PARTITIONS AND DUCT WORK.



**FIG. 2 - PART PLAN OF FIRST FLOOR SHOWING EQUIPMENT LAYOUT**

space under the offices to take care of equipment on the first floor. There isn't to be any additional remodeling at this time and the client wants as little disturbance as possible during this installation. It is possible that partitions may be added or taken down, but very little likelihood of same.

- (h) The space is owned by the client and he pays all taxes, utility bills, etc.
- 2. *Heat Gain Calculations* are figured as shown in Tables 1, 2, 3, 4, 5.
- 3. The existing furred ceiling has only twelve inches in the clear at the high point of the roof and as little as six inches at the low point. The fact that a duct above the ceiling would have to be insulated, running the costs high, plus the fact that the owner wants as little cutting and patching done as is possible, makes an exposed duct on the ceiling about the cheap-

est and best way to handle the general office. It is very important after making this decision that special attention be paid to the specification on the sheet metal, inasmuch as a show job of exposed ductwork is necessary. The client may elect to just paint the ductwork or he can always cover it with wall board, plaster, or whatever he chooses to do. For the private offices the logical place for the ductwork is in the hall. This provides for easy access to the rooms from the main trunk, taking branches off each side. This method again calls for neat ductwork, which may be left exposed and painted or, in this case, it would be a simple matter to fur this ductwork in by just putting a new ceiling in the hall below the ductwork. In either case it will be necessary to lower the existing hall lights to the under side of the duct.

**TABLE 1—DESIGN TEMPERATURES**

TERMPEATURE	DRY BULB	SENSIBLE HEAT PER LB.	WET BULB	TOTAL HEAT PER LB.
Outside.....	95°	22.96	75	37.81
Room.....	80°	19.32	67	31.15
Entering coil.....	85°	20.53	69.9	33.43

**TABLE 3—PEOPLE LOAD**

SPACE	NO. PEOPLE	SENSIBLE HT BTU/Hr.	LATENT HT BTU/Hr.
Office No. 1.....	2	400	360
Office No. 2.....	2	400	360
Office No. 3.....	2	400	360
Office No. 4.....	2	400	360
Office No. 5.....	2	400	360
General Office.....	15	3000	2700

TABLE 2—SENSIBLE HEAT TRANSMISSION THROUGH WALLS

SPACE	EXPOSURE	SQ. FT. AREA	COEFF. OF HEAT TRANS.	TEMP. DIFF.	BTU PER HR.	RADIAN T SUN EFF.	
						BTU/Hr./ Sq. Ft. Area	BTU/ HR.
Office No. 1	North wall	180	0.3	15	810	.....	.....
	North glass	36	1.13	15	610	.....	.....
	East wall	162	0.3	15	730	26	1265
	East glass	18	1.13	15	305	32	650
	Roof	270	.18	15	730	.....	.....
	Floor	270	.34	15	1380	.....	.....
Office No. 2					4565		1915
	North wall	90	0.3	15	405	.....	.....
	North glass	18	1.13	15	305	.....	.....
	Roof	135	.18	15	364	.....	.....
	Floor	135	.34	15	689	.....	.....
Office No. 3					1763		.....
	East wall	162	0.3	15	730	26	1265
	East glass	18	1.13	15	305	32	650
	South wall	90	0.3	15	405	.....	.....
	South glass	18	1.13	15	305	12	244
	Roof	135	.18	15	364	.....	.....
	Floor	135	.34	15	689	.....	.....
Office No. 4					2798		2159
	(Same as for Office No. 2)				1763	12	244
Office No. 5	(Same as for Office No. 2)				1763	12	244
Gen'l Office	North wall	342	0.3	15	1540	.....	.....
	North glass	54	1.13	15	916	.....	.....
	West wall	366	0.3	15	1650	23	2530
	West glass	54	1.13	15	916	40	2440
	South wall	342	0.3	15	1540	.....	.....
	South glass	54	1.13	15	916	.....	.....
	Roof	1155	.18	15	3120	.....	.....
	Floor	1155	.34	15	5900	.....	.....
					16498		4970

NOTE: No Radiant effect charged against roof due to water on same.

In determining the method of air distribution, the job sometimes dictates or limits the possibilities. In this case it would be undesirable to have an exposed duct across the ceiling of the private offices, so that, while ceiling distribution might be the most desirable, the most practical way is to have side wall distribution for the private offices. Experience should be the determining factor in deciding whether or not it would be the difference between a good job or a bad one to change from ceiling distribution to sidewall. The writer feels that ceiling distribution is the most desirable where it can be had without penalizing the job too much in cost. We all know, however, that there are a great number of very satisfactory jobs with this type of sidewall distribution, so that this experience, plus the additional cost and bad appearance, commits the engineer to use sidewall distribution for the private offices.

#### General Office Air Distribution

The general office presents a different picture, inasmuch as this room can very easily be handled with one ceiling outlet placed in the center of the space and blowing equally in all directions.

The return air grille for the general office can

be located in most any location as long as the system is just for cooling. This works out quite frequently alongside of the supply riser. Very often this grille and ductwork takes up the lower portion of shelving or, if no shelving exists, the top is finished like a radiator enclosure. The private offices should each have a return air connection of their own. In some instances jobs of this type have been installed with one return air grille for a suite of offices with the grille located in the corridor and then have each door undercut or have a door type grille in each door, but if it is at all possible, each room should have its own individual return air grille.

#### 100% Outside Air

The duct system should be arranged for 100 per cent outside air. This leads to economy of operation for practically all parts of the cooling season. In mild weather, when the outside temperature is about the same as the client wants inside, it is good economy to run on 100 per cent outside air. After a prolonged hot spell, the night man can run the fan only, with 100 per cent outside air, and cool the building proper down to outside air tempera-

TABLE 4—TOTAL INTERNAL LOAD

SPACE	SENSIBLE HT IN BTU/HR.				LATENT HT BTU/HR.
	TRANSMISSION	SUN EFFECT	PEOPLE	TOTAL	
Office No. 1....	4565	1915	400	7766	360
Office No. 2....	1763	.....	400	2163	360
Office No. 3....	2798	2159	400	5357	360
Office No. 4....	1763	244	400	2407	360
Office No. 5....	1763	244	400	2407	360
General Office....	16498	4970	3000	24468	2700
Total Internal Sensible Heat.....				44568	
Total Internal Latent HT.....					4500

Note: No electric lights figured due to 4 wall exposed with glass in all walls.

#### Ventilation Requirements and Heat Gain

##### Total Internal Sensible

$$\begin{aligned} \text{Total Air} &= \frac{1.08 \times \text{Diffusion Temp.}}{44,568} \\ &= \frac{1.08 \times 15}{44,568} = 2,750 \text{ cfm. (use 3,000 cfm.)} \end{aligned}$$

Outside air ..... 1,000 cfm.

Sensible heat per lb. of outside air ..... 22.96

Sensible heat per lb. of room air ..... 19.32

##### Sensible Heat Gain of Outside Air:

$$1,000 \times 4.5 (22.96 - 19.32) = 16,400 \text{ Btu/hr.}$$

Latent heat per lb. of outside air ..... 14.85

Latent heat per lb. of room air ..... 11.83

##### Latent Heat Gain of Outside Air:

$$1,000 \times 4.5 (14.85 - 11.83) = 13,600 \text{ Btu/hr.}$$

ture. The outside air intake should have an automatic damper controlled by a gradual switch which can be set for any amount between full open and full closed.

#### The Control System

The main control will be a thermostat in the return air line. In an office, where the period of occupancy is long, it is not good procedure to increase the inside temperature at a set ratio with the outside air, as the employees will sense such a change and immediately feel warm. In an office it is a matter of finding a temperature at which office employees can work comfortably and hold to that for the whole day. The plant shouldn't be started until just before the office opens and cooling or refrigeration should be shut down (not the fan itself) about thirty minutes before closing time. This prevents shock and cools the help down gradually in the morning and likewise allows them to warm up a little before leaving, thus preventing a sharp differential as they go outside.

Because of exposures on all sides it is very important to have controls for each of the private offices. This can be accomplished with manual remote controlled dampers behind each grille or with thermostatically controlled dampers behind each grille. The writer has found manual control better where only one person is to be satisfied, but for the general office a thermostat located in the space would be more desirable.

Due to the long period of occupancy, a 15-degree design temperature differential is used in place of the 12-degree differential used for drug stores, where the occupancy is relatively short.

4. The space for equipment is not usually as vital on an industrial job as it is on a drug store or some other rented space where the space is really at a premium. Here the man you

TABLE 5—TOTAL HEAT GAIN  
*Sensible*

Internal .....	44,568 Btu/hr.
Ventilation .....	16,400 Btu/hr.
<b>Total .....</b>	<b>60,968 Btu/hr.</b>
<i>Latent</i>	
Internal .....	4,500 Btu/hr.
Ventilation .....	13,600 Btu/hr.
<b>Total .....</b>	<b>18,100 Btu/hr.</b>

Total load to be handled by well water coils =  $60,968 + 18,100 = 79,068$  Btu/hr., this being the equivalent of 6.6 tons of refrigeration.

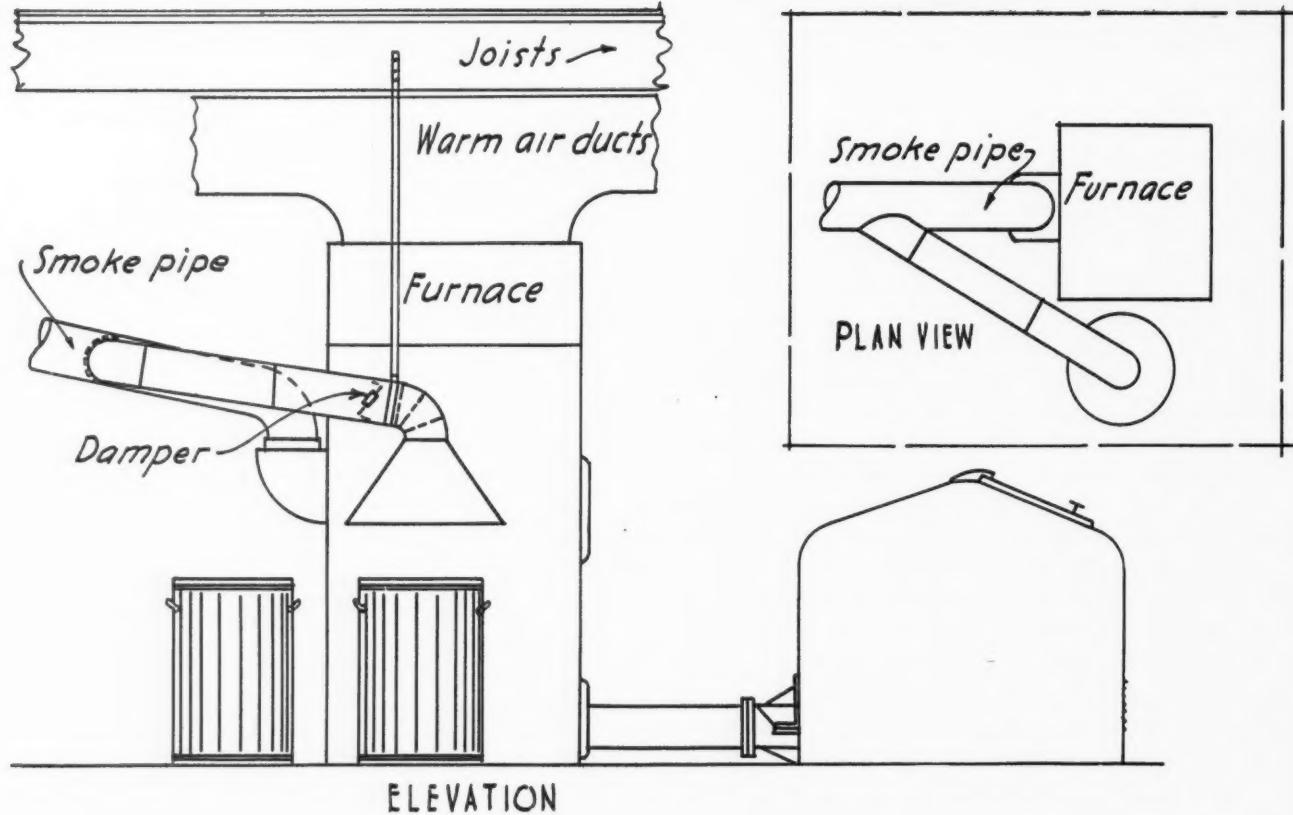
#### COST ESTIMATE FOR A SMALL INDUSTRIAL SUITE OF OFFICES

1. Fan (including motor-starter and drive) ....	\$ 250.00
2. Water cooling coil.....	200.00
3. Galvanized water pipe and fittings.....	75.00
4. Pipe dope, etc.....	5.00
5. Foundations and hangers.....	30.00
6. Filter and filter frames.....	30.00
7. Sheet metal work.....	750.00
8. Grilles, registers and ceiling outlets.....	125.00
9. Duct insulation .....	300.00
10. Automatic control system.....	175.00
11. Electric wiring .....	75.00
12. Pipe covering .....	105.00
13. Cutting, patching and painting.....	100.00
14. Pipe fitting labor—15 days.....	180.00
15. Social Security and insurance.....	12.60
16. Incidentally, freight and drayage.....	25.00
	_____
	\$2,437.60
15% overhead .....	365.64
	_____
	\$2,803.24
10% profit .....	280.32
	_____
	\$3,083.56
1% sales tax.....	30.83
	_____
Selling Price .....	\$3,114.39

talk to will realize that mechanical equipment takes space. The fact holds true, however, that the closer all the equipment can be together without crowding, the cheaper the overall cost of the job.

With 53-degree well water available on a relatively small office job, this should do a good cooling job as long as the coils are selected in accordance with the load and the available water temperature. This means that this job will consist of a fan, filters, water cooling coils, controls, grilles and registers and the sheet metal distribution system. All of the ductwork in the factory section should be well insulated.

The owner has more well water than he needs for his factory purposes and has sufficient pressure to push the water through the coils and up to the roof over the offices so that after the water is used in the cooling coils it is discharged on the roof, which will eliminate a good portion of the sun load on the roof. Inasmuch as the owner has no particular use for this water, it would have to be discharged to the sewer anyway, so that by putting it over the roof it does more work before going into the downspouts and thence to the sewer.



## Easily-Made Fume Hood For a Domestic Stoker

By George A. Gowdy  
Chief Engineer, Stoker Division, Morse Chain Co.

ON conversion stoker installations in existing heating plants, where there is no drawer or similar space provided in the furnace or boiler to receive hot clinkers when removed from the fire-bed, some criticism may result from the fumes released in the basement when clinkers are dropped in open cans. The device illustrated has proved very effective in overcoming these objections.

The construction in general can be adapted to practically any heating plant regardless of the flue location. It consists of a cone made from light sheet metal connected with 5-inch pipe to the main flue. A damper should be used above the cone and should be closed except when removing clinkers so as not to decrease the draft on the main flue. This damper should be practically air tight, and is quite easily made by using two circular pieces of asbestos paper slightly larger than the pipe. These are bolted one on either side of

the conventional stove pipe damper using two discs of sheet metal slightly smaller than the inside diameter of the pipe and assembled in the pipe in the regular way.

The base of the cone should be from 12 to 18 inches larger in diameter than the ash receptacle used and should be hung as close to the top of the cans as will allow the clinkers to be dropped in conveniently.

If automatic draft regulation is used on the main flue, it is essential that the 5-inch pipe be cut in on the chimney side of the regulator.

This is a simple and inexpensive arrangement which will be readily appreciated by the stoker owner and will give the sheet metal man another door opener to a prospect who may be cultivated for air-conditioning or other major jobs.

The sketch shows a diagrammatic arrangement of such a device, and a few minutes conversation with bituminous stoker users will convince any contractor of the potential business available.

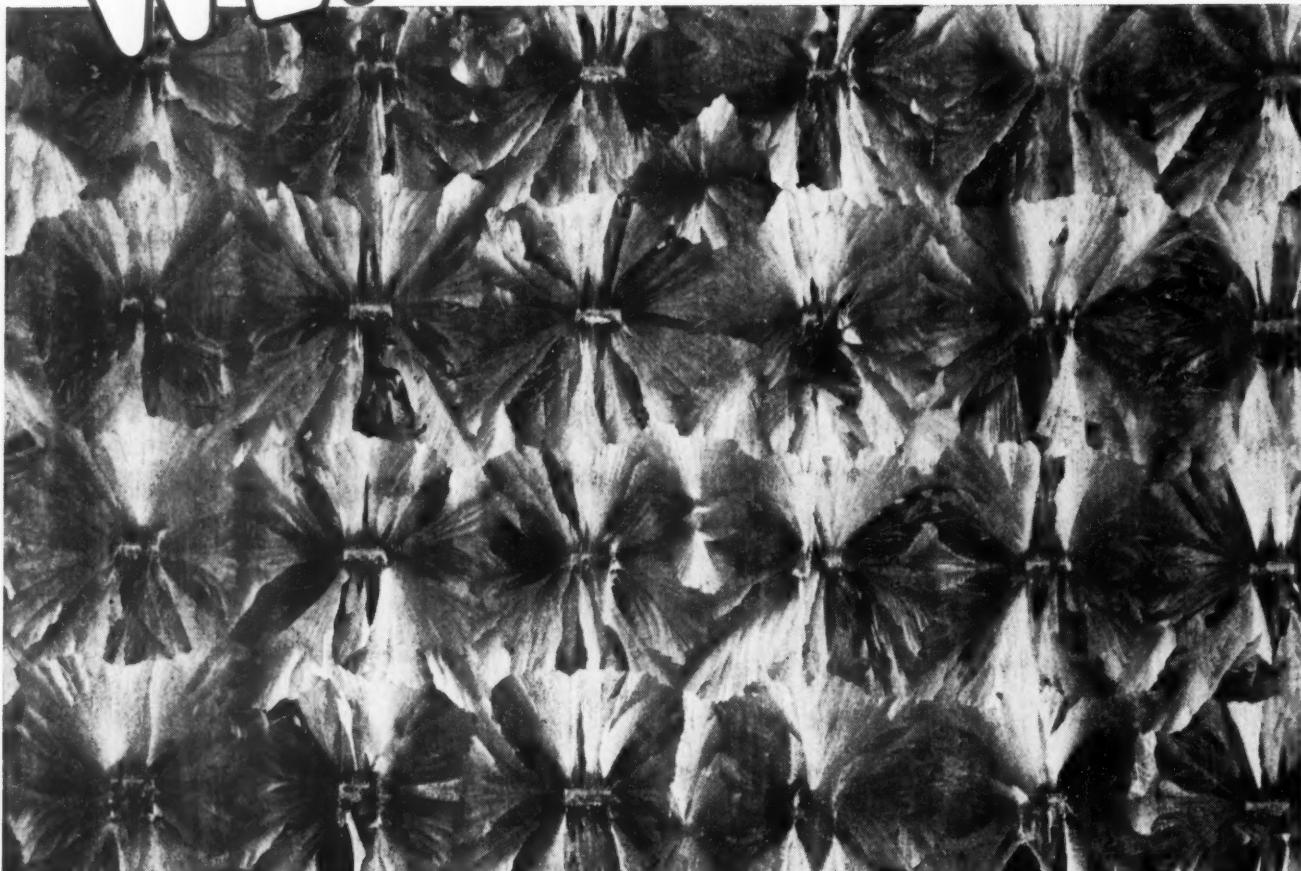
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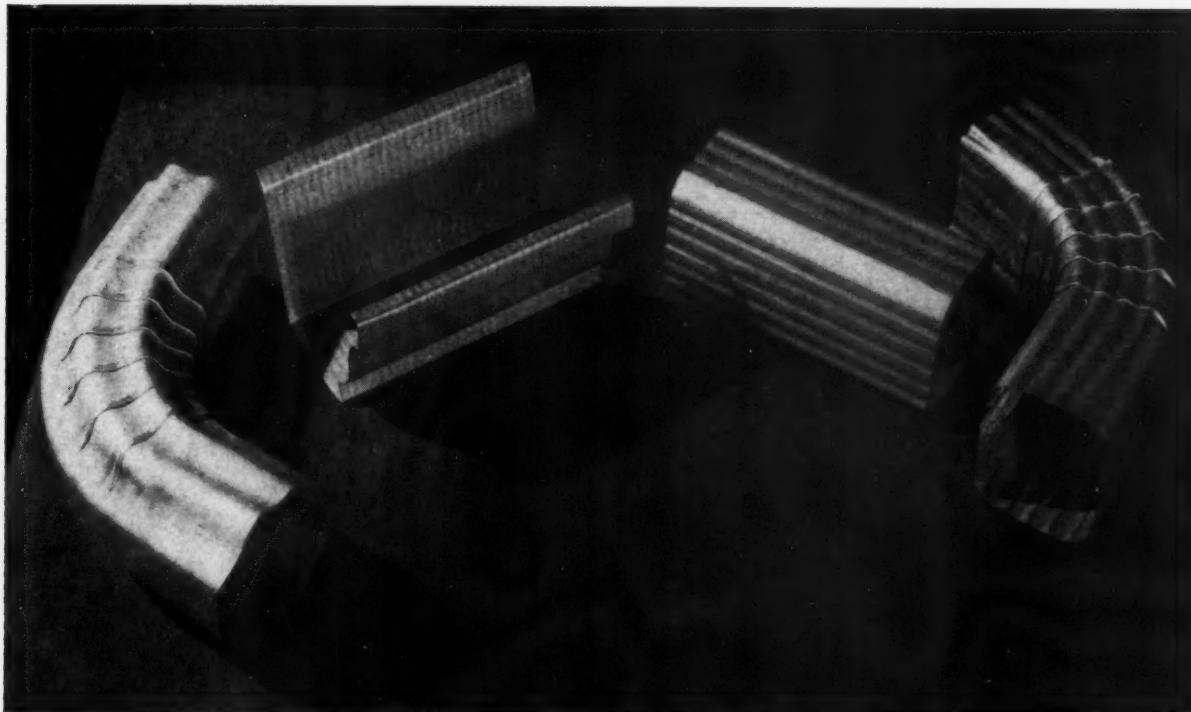
### WEIRTON, W. VA.

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Executive Offices, Pittsburgh, Pa.



The dead soft temper of 28-gauge chromium nickel stainless steel makes it easy to manufacture all standard forms of drainage system parts and fittings. (American Rolling Mill Co. photo.)

## Stainless Steel for Home Roof Drainage

By Fred Kehrer

The American Rolling Mill Company

STAINLESS steel, for exterior covering has now passed its ten-year period of service on the mooring mast atop the Empire State Building and the spire on the tower of the Chrysler Building in New York City. In both installations the metal remains in prime condition despite the constant attack of smoke, soot, and salt air. Sheet metal contractors will be interested to know that the stainless steel used on these "world's two tallest buildings" is of the same composition as the stainless steel recommended for roof drainage construction today. The ductile temper of 28-gage chromium-nickel stainless steel, type 301, makes it as easy to work as 26-gage galvanized iron or 16-ounce copper.

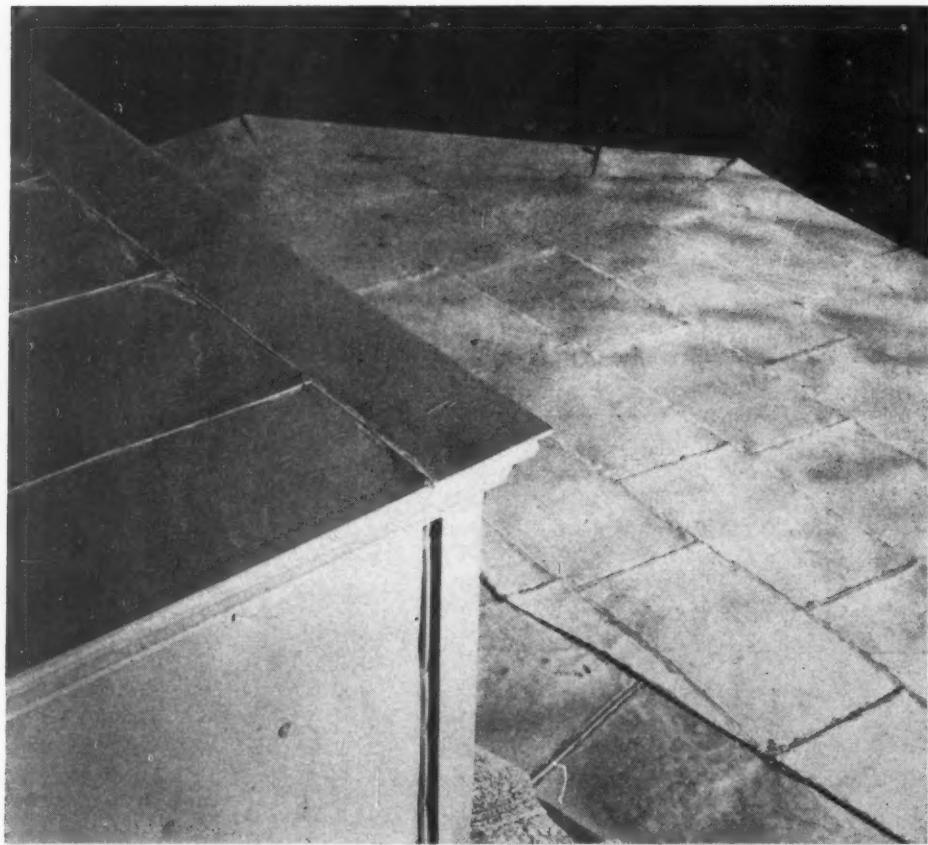
### Unpolished Sheets Reduce Cost

Because the use of stainless steel is comparatively new in the roof drainage field there are misconceptions about its cost, both to the contractor and to his customer. Some think of stainless as an expensive metal to be used only for decorative work, kitchen equipment, and other familiar applications. Yet the grade of stainless steel

most satisfactory for roof drainage work is cold-rolled and *not polished*; and it is the elimination of the costly polishing operation that brings the metal within the reach of many builders and property owners. Furthermore, it is not necessary to use heavy gages for this application.

Leading manufacturers of conductor pipe, gutters and accessories are now offering these products in 28-gage chromium-nickel stainless steel at a price comparable with that of the highest-grade traditional metals. Stainless steel nails, rivets, screws, cleats, and bolts are also available to make the job completely stainless. By avoiding the use of common steel there is no chance for discoloration of the stainless due to rusting of accessories. Hangers, hooks, circles, straps, shanks, and other accessories should be stainless steel, but if these cannot readily be procured, lead-coated bronze or lead-coated copper may be substituted to preserve the color effect.

There are several important points to remember. It is common knowledge that roof drainage systems are constantly subjected to contraction and expansion. Allowance must be made for this



Close-up of a small stainless steel covered deck and roof laid with flat locked and soldered seams. Supporting surfaces should be free of all humps, hollows, nail heads, etc., before the sheets are laid. On facing page is shown a picturesque winter scene, but the load of snow and ice imposes a severe strain on the drainage system. The 45,000-pound yield strength of stainless steel resists destruction. (American Rolling Mill Co. photos.)

in stainless installations as in others; yet stainless steel has a decided advantage owing to its high tensile strength. Chromium nickel stainless steel has an ultimate strength of 90,000 pounds per square inch, which is greater than that of any other material used for this purpose.

#### **Stainless Resists Stress and Abrasion**

Even more important, the "fatigue strength" of stainless steel is high. Every contractor knows that winter is the season most severe on roof drainage systems. Sharply changing temperatures and heavy loads of ice and snow are trying tests for most materials. Sagging is a common failure; however the yield point of chromium-nickel stainless steel is so high (45,000 pounds per square inch) that when properly installed there is little likelihood of this. Sheet metal workers and painters have learned that stainless sheet metal work does not dent easily when ladders with workmen lean against it.

Abrasion is another problem in drainage systems although it usually does not arise early in the life of the installation. Solids washed along with rainwater gradually wear out gutters and conductors and especially elbows and valleys. Stainless steel goes a long way toward solving this problem since it is highly resistant to abrasive action as well as to corrosive action.

There is no way of telling how long stainless steel roof drainage systems will last, because the first known installations show no indication of failure. When water collects in puddles on most painted metals it usually hastens peeling of the paint, and the underlying metal is subject to rust

action. The fact that stainless steel is rustless is a decided advantage, on flat surfaces as well as formed.

From the standpoint of appearance, the soft, natural color of stainless steel gutters, conductor pipe and accessories will harmonize with most architectural schemes. However, if the architect or customer desires that the metal be painted, this can readily be done and no special preparation is required. As with any other metal, the surface must be clean and dry. The same primer and cover coats can be applied to stainless as to the rest of the building, and of course there is no need to paint inside the gutter. Stainless steel makes an excellent base for paint, does not affect its elasticity, and increases paint life, since there is no danger of undercoat corrosion.

#### **Installation Practices**

There are a few installation hints to be kept in mind. Make sure that all surfaces to receive stainless coverings are free from hollows and projections and that all nail heads are set. Valleys, decks, roofing, and gutter linings should be laid on dry felt or paper. All forming should be done with regular equipment. During fabrication, care should be taken to keep all work surfaces and tools free from dirt and to refrain from walking on the metal or placing other materials on it. While stainless steel is far from being a delicate metal, carelessness simply means more clean-up work when the job is done.

Muriatic acid generally is used in the cleaning of masonry on buildings. Not only does it cause a yellowish discoloration when used on white

limestone, but it is injurious to all roofing materials, including stainless steel. Nitric acid has been found more satisfactory than muriatic for this purpose, and at the same time does not discolor white limestone. Stainless steel is unaffected by nitric acid: in fact its corrosion resistance is improved if anything by a thorough cleaning with this acid followed by a water rinse to prevent acid stains.

#### Soldering Technique

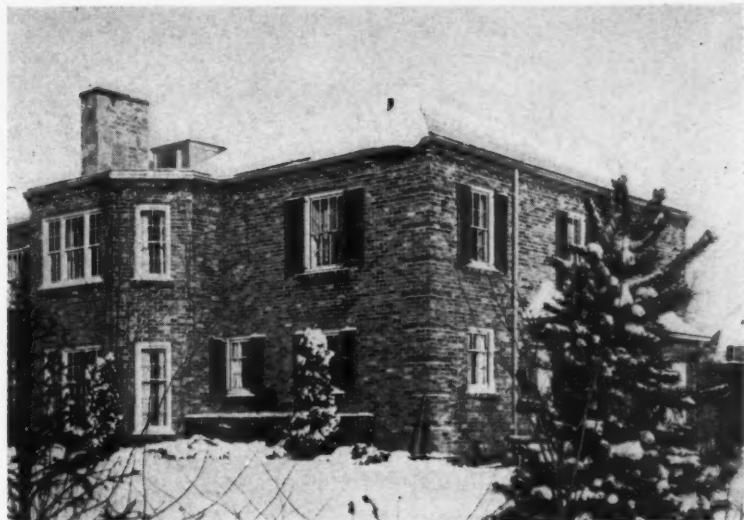
Standard soldering practice may be employed; and neat work can be obtained by using 50-50 solder or commercial stainless steel solders. Several good stainless steel soldering fluxes are available. Excellent results are obtained from a flux consisting of half uncut muriatic acid and half cut acid.

Immediately after soldering, wash all the joints with a 5% to 10% solution of washing soda in water and rinse with clear water. All stains and dirt should be removed with soap or good cleaners such as Dutch Cleanser, Babo, or Bon Ami, applied with a *fibre* brush. Ordinary steel wool or steel wire brushes *should not be used* as they are apt to imbed iron particles in the metal. Stainless steel wool and wire brushes are available and should be used when necessary.

The reasons why stainless steel is desirable as a roof drainage material—in the interest of the sheet metal contractor as well as that of the owner or architect—can be summed up in this way:

No special tools or equipment are required in the shop or on the job; for the ductility of the metal makes it quite easy to work.

From evidence gathered in twelve years of usage under all atmospheric conditions there is every indication that stainless steel belongs in the classification of the so-called "permanent" materials and thus is economical in cost-per-year service.



As for installed cost, this compares favorably with other high-grade materials and is no deterrent where the builder or owner is willing to make a small additional investment to assure distinctiveness and ultimate low cost.

Stainless steel is the strongest of all metals used for this purpose, and this means that when the job is properly installed there is little likelihood of sagging and cracking. Its neutral color is attractive; yet it may be painted, if desired, with no danger of undercoat corrosion.

Being a tough metal, stainless steel gutters and conductors, especially elbows and valleys, resist the abrasive action of solids washed along by rainwater.

Stainless steel roof drainage construction remains clean in service. Rust, patina or other discoloring products cannot form on the surface of the metal to wash off and stain adjoining areas of the building.

Certainly when a skillful job has been done with stainless steel, the contractor can be confident that his work will stand up and long be a credit to him, enhancing his reputation and leading to much valuable word-of-mouth advertising.



This garage door canopy laid with batten ribs and the drainage system are stainless steel. So are the rising wall flashing pieces. Stainless steel in 28-gauge is as workable as 26-gauge galvanized or 18-ounce copper in details of this type. (American Rolling Mill Co. photo.)

# Product Finishing

## Evaluation of Spray Operator Ability\*

By Willoughby G. Sheane  
Chemical Engineer, General Electric Co.

**I**N determining exact finishing costs, it is necessary that a method for the complete analysis of the sprayer's ability be used. Ratings based on time studies alone leave much to be desired since no account is taken of the material used, or rather, of the material wasted. It is the purpose of this discussion to develop a true rating method, one showing the effect of various factors on productivity and indicating where labor and material savings may be made.

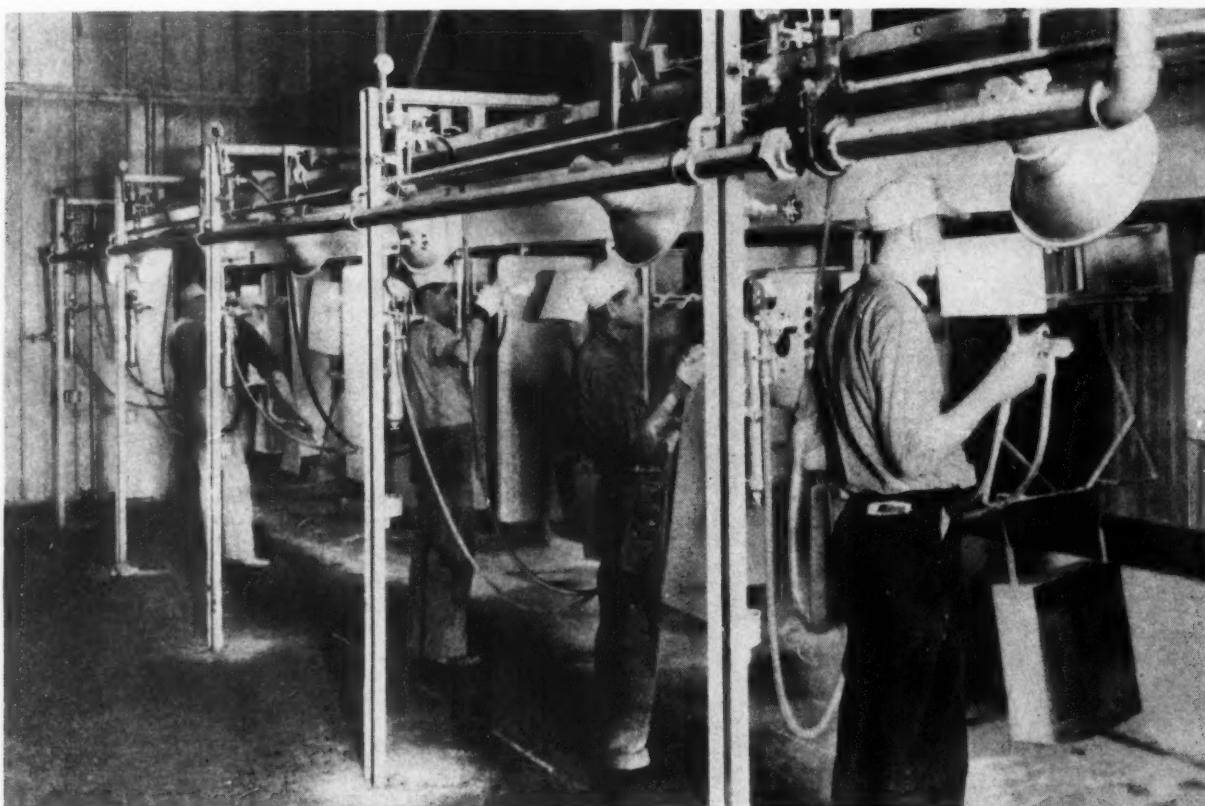
In general, the productivity of a spray operator is dependent on two factors; first, that portion of finishing operation time actually spent in spraying, and second, that portion of finishing material used which is actually applied. These two factors may be called *Labor Utilization* and *Material Utilization*, respectively.

\*Reprinted by permission from "Metal Finishing," October, 1939.

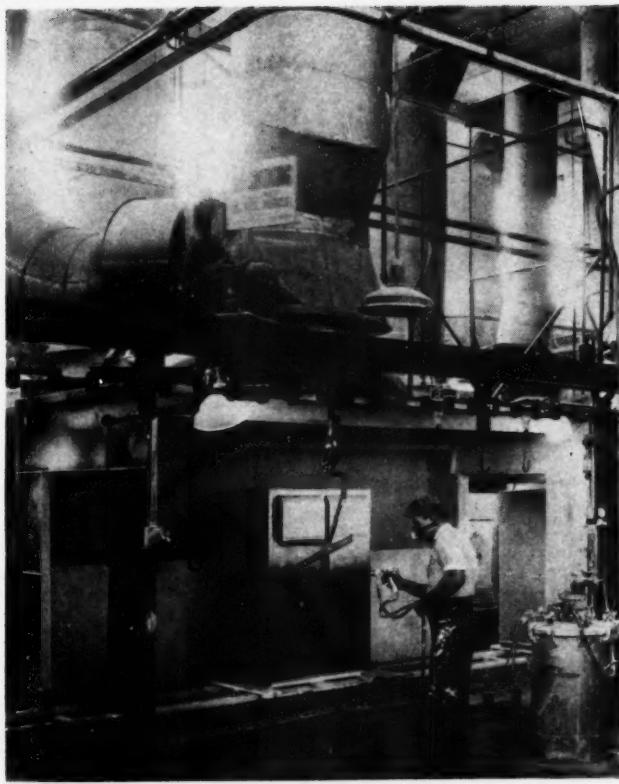
The ideal operator would spend *all* of his time in spraying (complete labor utilization) and would apply *all* the material delivered by his gun with no waste (complete material utilization). If a sprayer triggers his gun, or stops frequently to inspect his work, or loads and unloads slowly, the amount of time given to spraying is small and his production will be proportionally low. Further, if an operator embraces a technique which allows large material losses, his production will be low for the obvious reason that the wasted material represents unproductive spraying effort.

### Labor Utilization Factor

Let us assume a sprayer whose material utilization is 100%. Inasmuch as there is no time lost in spraying unproductive material, the operator's productivity will be a function of his labor utilization only. This labor utilization may be expressed



Operators spraying refrigerator cabinet parts. This article sets up a formula for evaluating each operator's ability and efficiency.



Left—Spraying refrigerator cabinet parts along a continuous trolley from spray booth to oven. Below—Spray finishing small radio cabinets in booth and with equipment especially designed for small units.

as follows:

$$Lu = \frac{Va}{Vp} \quad \text{Eq. (1)}$$

where:

$Lu$  = labor utilization factor

$Va$  = actual volume of material sprayed per time unit—gallons

$Vp$  = possible volume of material sprayed per time unit in gallons

For example, an operator uses 0.6 gallons of material per hour ( $Va$ ). However, the gun at the adjustment used, has the capacity to deliver 1.0 gallons per hour ( $Vp$ ). This indicates that during 40% of the hour the gun is closed and no work is being sprayed. The labor utilization factor, therefore, is  $Lu = \frac{0.6}{1.0} = 0.60$ . Had the

gun been open for the full hour this factor would have been unity and the production greater in the ratio of 10 to 6.

#### Material Utilization Factor

Now consider the reverse situation. Consider this operator as having a labor utilization of 100%, but wasting part of the material he sprays as overspray, etc. In this case his productivity will be dependent entirely on the volume of material actually applied on the work in comparison with the volume sprayed. In other words, the work accomplished will be a function of the material utilization:

$$Mu = \frac{(A) (Tw) (N)}{(1.604) (Va)} \quad \text{Eq. (2)}$$

where:

$Mu$  = material utilization factor

$A$  = area per piece in square feet

$Tw$  = applied full wet film thickness in inches

$N$  = number of pieces finished per time unit

1.604 = constant

Since ( $Tw$ ) in Equation (2) can not be readily measured because of solvent losses, use is made of the relationship:<sup>1</sup>

$$Tw = Tc \frac{(833) (Dc)}{(Ps) (W)} \quad \text{Eq. (3)}$$

and Equation (2) becomes:

$$Mu = \frac{(519) (A) (Tc) (Dc) (N)}{(Ps) (W) (Va)} \quad \text{Eq. (4)}$$

where:

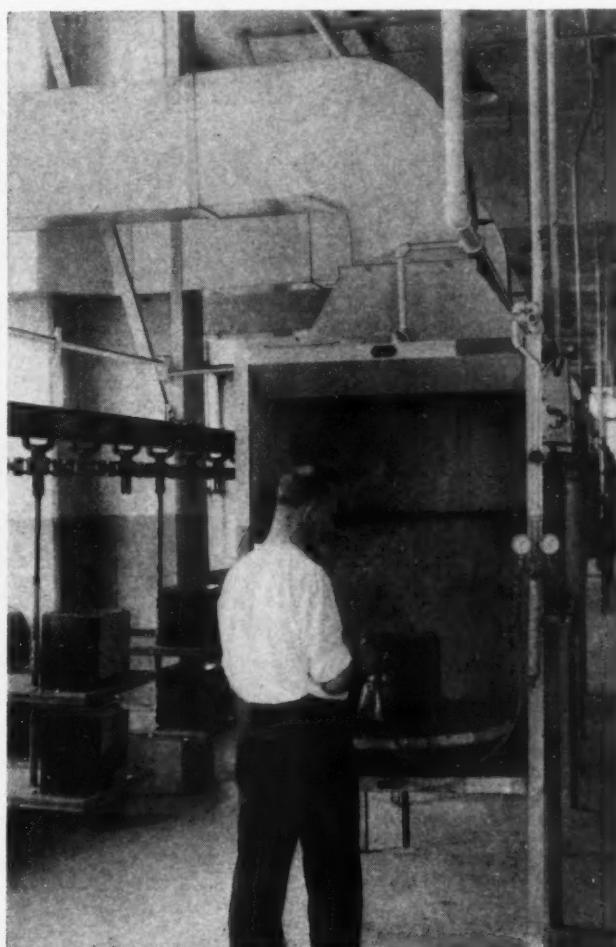
519 = constant

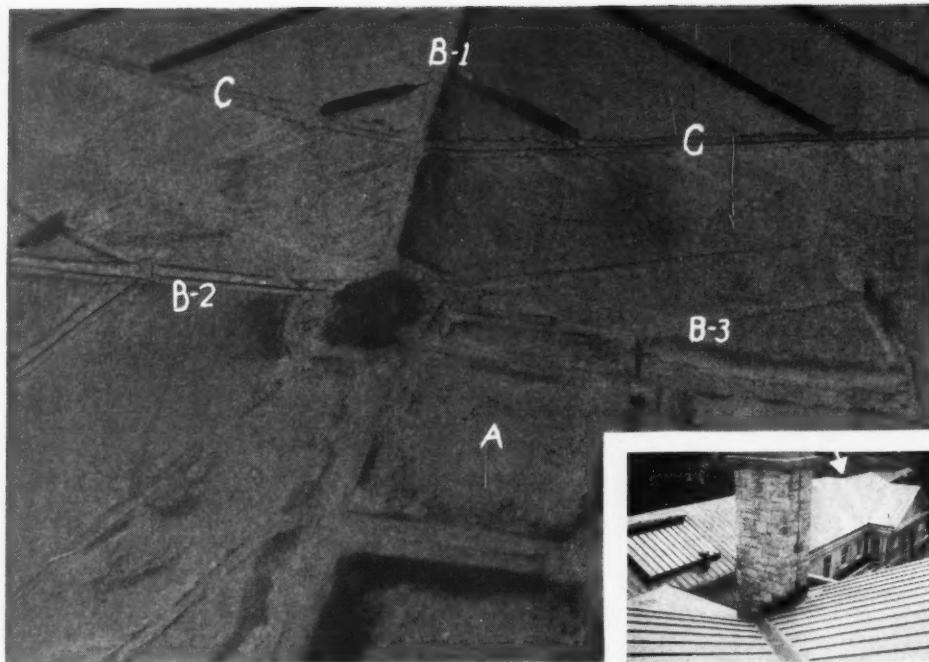
$Tc$  = cured film thickness in inches

$Dc$  = density of cured film in grams per cubic centimeter

1. Metal Industry, 37, No. 7, pp. 328-330, (1939).

(Continued on page 123)





**Photo No. 1—How not to handle intersections at ridges and valleys in standing seam construction.** The bottom right-hand corner of the picture (A) is the end of a long, narrow, flat-seam section (extending 100 feet to the right). Ridges from the upper (B-1) and left-handed sides (B-2) meet the three valleys and this corner in the center of the photo. All connections being soldered tight, the movement all concentrated at this point and plenty of trouble resulted. Arrow in inset shows location of closeup photo.

## Intersections--

Must be properly "anchored"; must have provisions for expansion and contraction; must be "held together" but not "tied"; must be properly cleated.

By Carter S. Cole  
Engineer, Copper & Brass Research Ass'n

INTERSECTIONS of the various parts of a roof area should be constructed with the recommendations mentioned in the preceding articles kept in mind. We should have "anchorage," we should have adequate allowance for expansion and contraction, and the separate areas should be kept separate—they should not be tied together. The principles to be followed are as simple as that. Properly executed design should give no trouble whatsoever—improper design can give us a lot of grief. Let us see how to avoid it in the construction of the various items that come under this heading—ridges, hips, valleys, connections to gutters, etc.

Here again the standing seam construction lends itself most readily to the easy accomplishment of a design that will give very satisfactory service. At the ridges and at hips the standing

seams are turned over (with the folded portion of the seam underneath) and formed into another standing seam running along the ridge or hip. This seam is usually higher than the pan seams. The seam may be turned down flat against the roof, or a batten may be used instead, but it is our observation that the simple standing seam for these points gives the best service.

One point to remember—do not bring two hip lines into a junction with the ridge standing seam at the same point where one or more of the pan standing seams meet it, too. Stagger the intersections—three lines coming together at one point is all that can be properly handled to give a neat and satisfactory job. (See photographs 2 and 5.)

Standing seam areas can likewise be handled easily at the intersection with gutters or valleys. The connection between the sheets of the standing

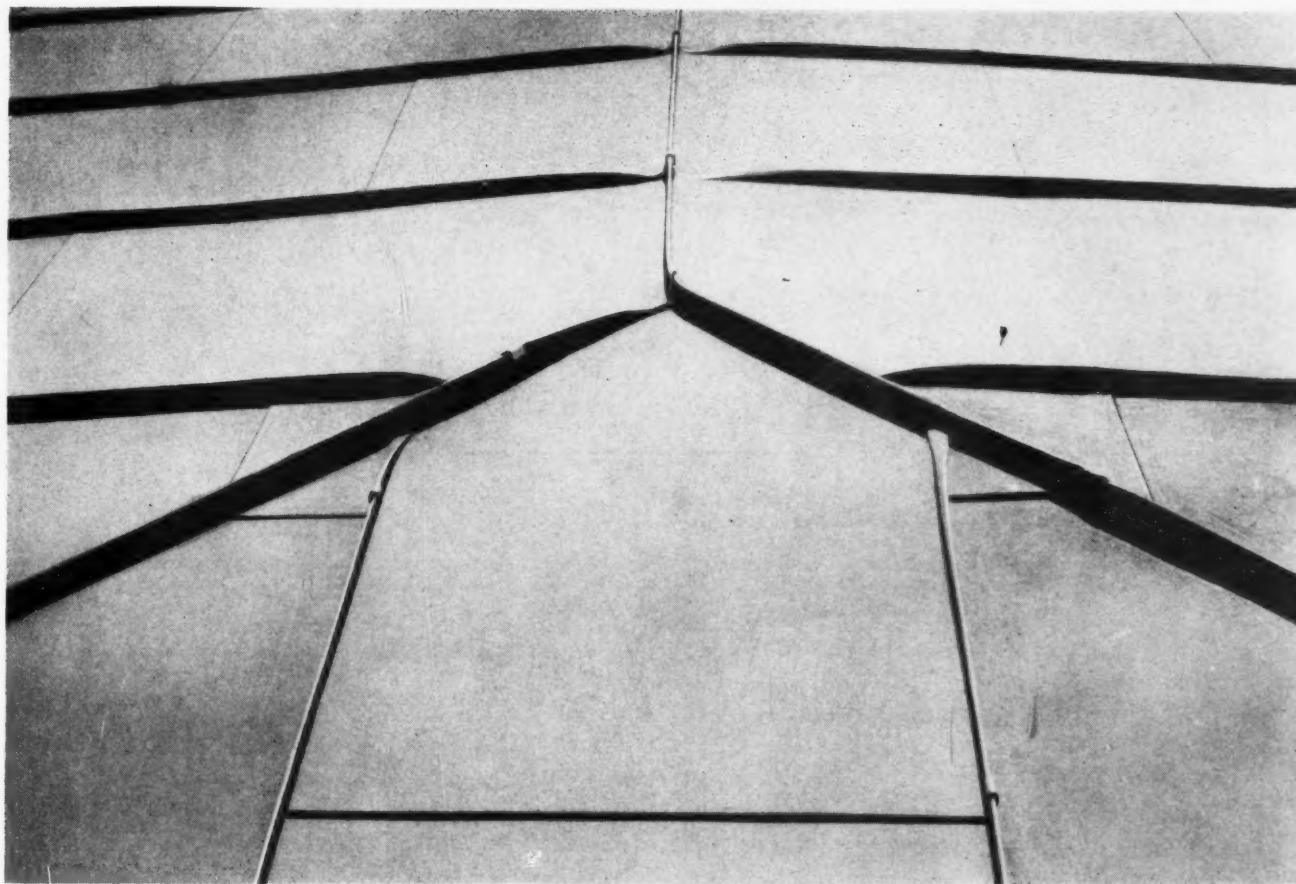


Photo No. 2—A ridge and hip intersection made by a real mechanic. Standing seam construction used as described in text.



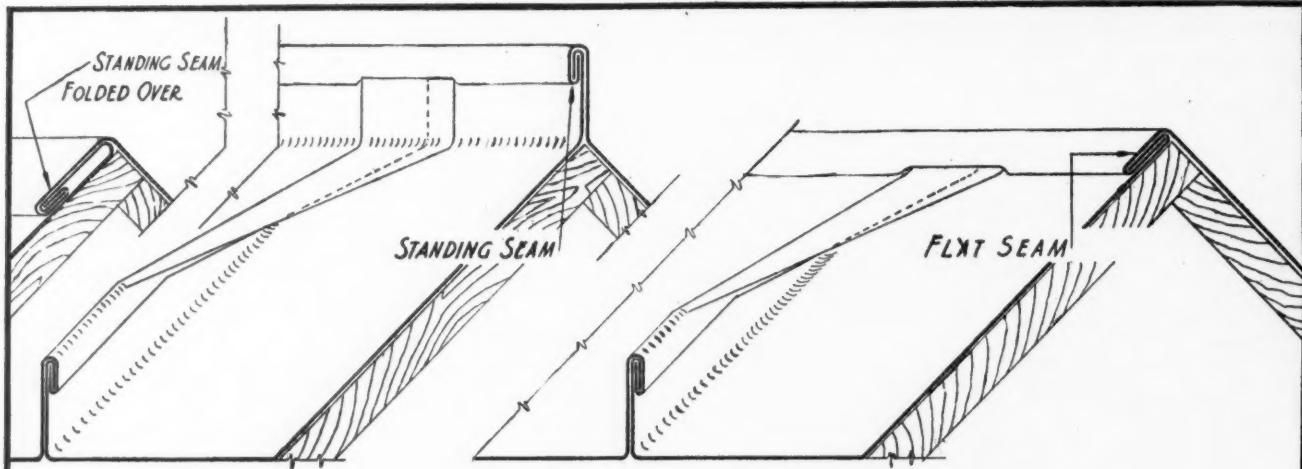
Photo No. 3—Standing seam at ridge and separate pan construction for the valley are features of this excellent installation.

seam section and the valley or gutter should, of course, be a cleated, loose-lock seam. The standing seams are turned over (with the folded portion of the seam on top so that moisture will not be retained in it) and locked into this loose seam. Another method—which this author does not consider nearly so good, but one which is often followed—is to cut the standing seam off square at the line of this loose lock connection and then to turn the end of the seam back flat against itself at 45°.

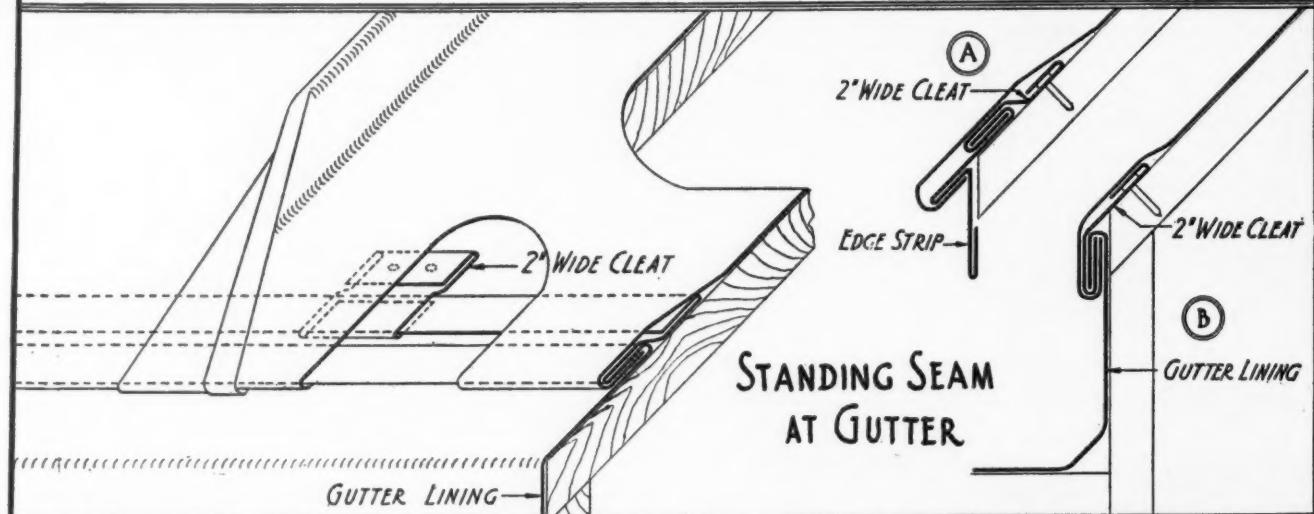
#### Handling Valleys

Still another way of handling the valley intersection, a method followed more abroad than in this country, is to treat the valley as a separate standing seam pan (see photo 3). Intersecting standing seams are turned over (down the slope) and formed into the standing seam on the edge of the valley. Where roof and valley slopes are low, this design is particularly useful, but it is not limited to such conditions.

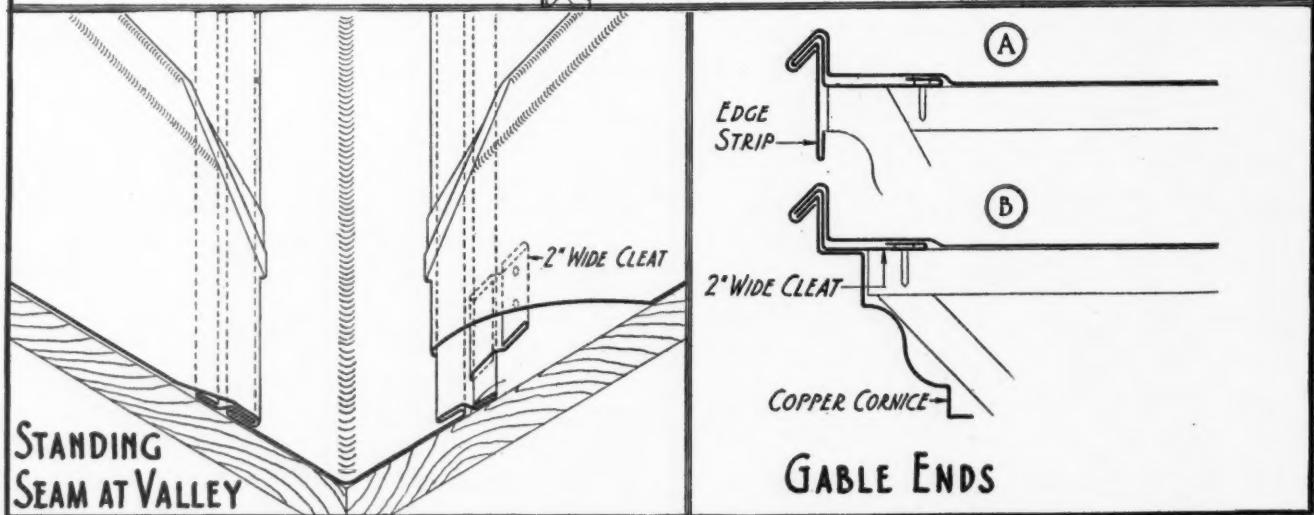
As can be seen in the accompanying drawings, good practice calls for an auxiliary fold in the gutter lining or valley metal for this loose lock intersection—the extra metal above this fold acting as a flashing for the joint. At eaves, standing seams can be turned over and locked in the same



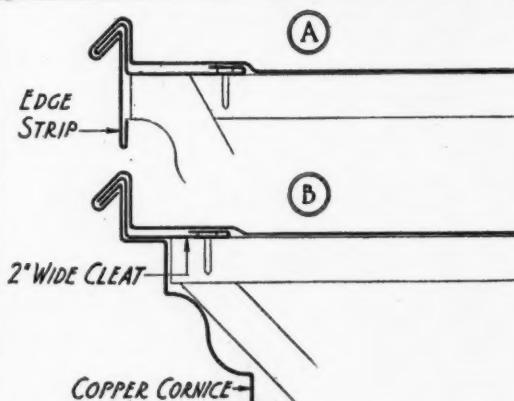
RIDGE DETAILS - STANDING SEAM METHOD



STANDING SEAM  
AT GUTTER.



STANDING  
SEAM AT VALLEY



GABLE ENDS

Details showing proper construction of standing seam slopes with ridges; slopes with gutters; slopes with valleys. From Copper and Brass Research Ass'n "Sheet Copper Handbook"

manner to an edge strip. Where two standing seam areas having different slopes intersect on a horizontal line, the standing seams should not be carried over the break. The standing seams of the upper portion should be turned over as at a gutter intersection or valley—those of the lower area should be turned down and locked in as at

a ridge or hip. Incidentally, such an intersection is an excellent place for the continuous cleating feature that we mentioned in a previous article of this series.

It would seem to be a fairly simple matter to follow out the ideas that we have set forth above, but let us consider the photographic evidence of

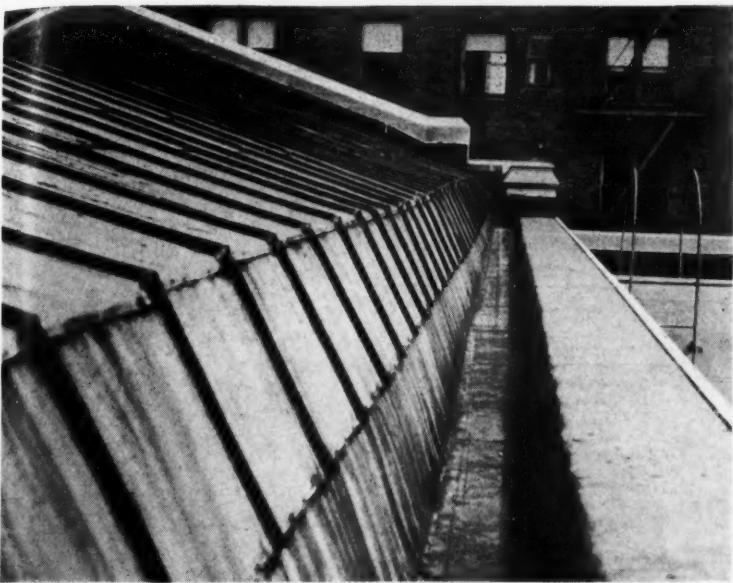


Photo No. 4—Bringing a standing seam over a break in slope and patching it up with solder makes a poor-looking and unsatisfactory job. The gutter lining should not have been locked directly into the reglet, but into a separate reglet strip.

what has been done and what actually can be done. In photo No. 1 we see one of the outstanding examples that has ever come to our attention of how to do a bad job with good material. The bottom right-hand corner is, as can be seen, a flat deck (A) of flat seam construction—less than ten feet wide towards the bottom of the picture, but 100 feet long towards the right. (See inset). (In our opinion that portion of the roof should have been given some slope and have been handled with standing seam construction—but that is another story. At the very least some loose lock connection between it and the other portions of the roof should have been effected, possibly by the use of a standing seam.)

#### "Horrible Example" Analyzed

But the main point that the picture illustrates is the grief that we can make for ourselves by soldering the ridge of a standing seam roof (B) and soldering the standing seam intersection with the valley (C) and then adding insult to injury by bringing the four ridges and three valleys of this construction together at one point. This design violates just about all the precepts that we have set forth in these articles and particularly the principles on the proper handling of intersections.

#### Proper Connection Between Areas

How could this job have been handled? There should have been a loose lock connection between the standing seam areas and the valleys (C) better still, the valleys could have been treated as standing seam pans, as mentioned just above. A standing seam should have been used along the

upper ridge (B1) (folded portion to left) continuing along the edge of the flat seam area. A standing seam should have been used on the left ridge (B-2) with folded portion and turnover towards us, and locked into this other ridge standing seam. On the right hand side (B-3) a standing seam should have been used between the flat seam area and the slope, folding (away from us) into this same ridge seam.

#### Avoid Flat Areas Where Possible

Better still—a sloping area should have been substituted for the flat area and a hip seam run down to that point of intersection. Then there would have been a construction as neat as that in photo No. 2, which shows the intersection of two hips and a ridge as it should be. Photo No. 3 shows good ridge and hip construction and a valley treated as a standing seam pan.

Photo No. 4 shows a break in roofing slope which should have been handled as described above but was not. Also, while there is a loose connection between the sloping portion of the gutter, the gutter sheets are locked directly into the reglet.

The purpose of these articles by Carter Cole is to show graphically what happens when standard practice is not followed. "Horrible examples" are being used purposely to add effect. We invite readers to submit their own "horrible examples" of good material mangled by improper application.

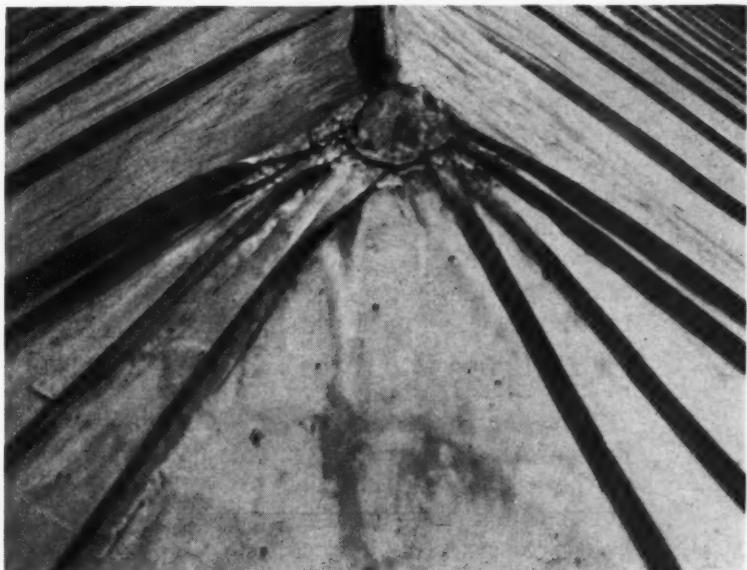
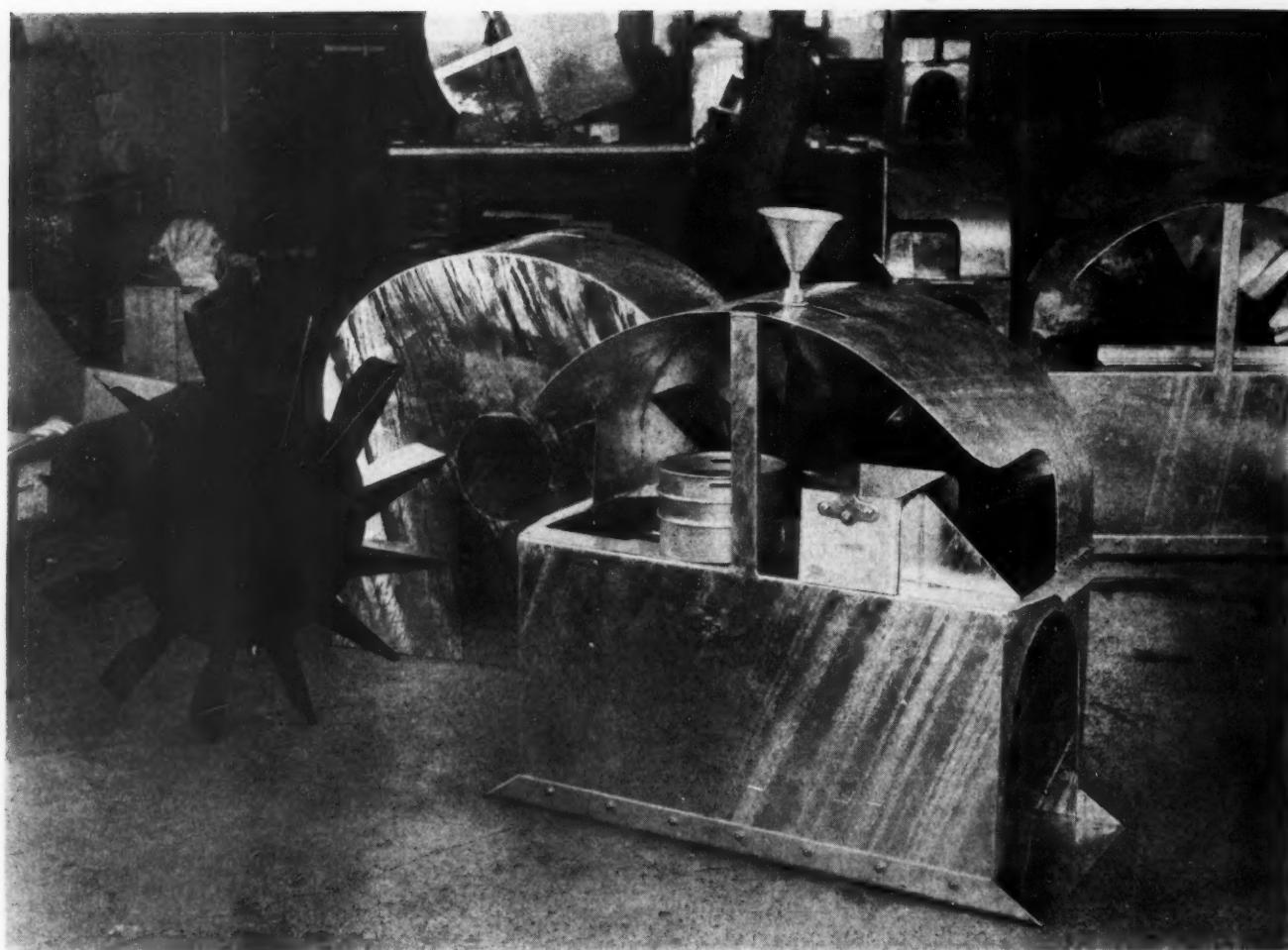


Photo No. 5—When an attempt is made to bring more than three lines of standing seams together at one point, it is easy to get into trouble.



## Heavy Gauge Oil Field Specialties Produced by Welding

IRA BAIN, operating the Bain Sheet Metal Works in Tulsa, Oklahoma, has built a profitable business from the fabrication of heavy gauge sheet metal specialties used in the oil industry. These specialties are machine guards, oil well mud sampling machines, engine housings—all of which run into large and heavy items—and all the usual tanks, trays, containers, boxes, pans, etc., common to oil activity.

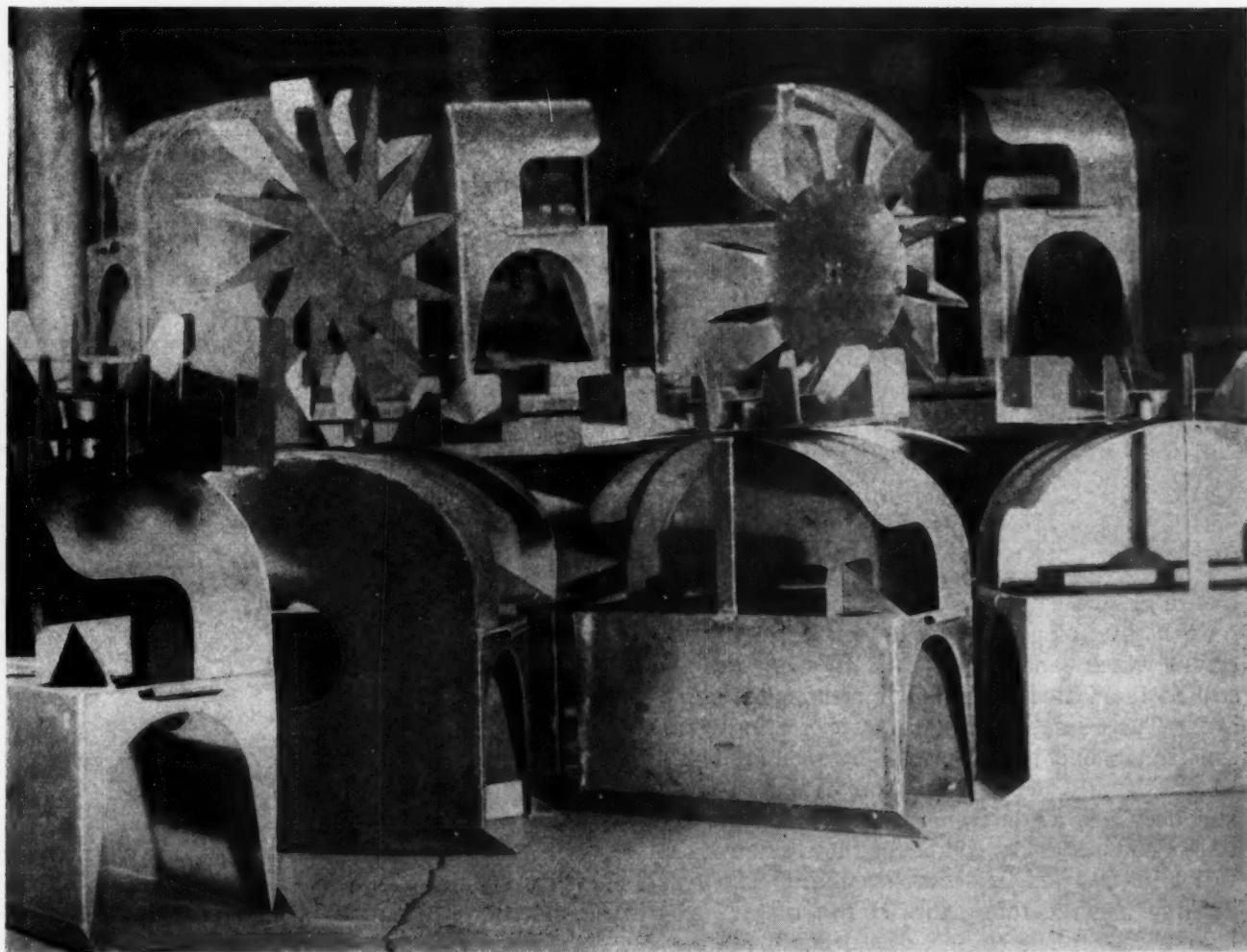
This specialty fabricating business has been built around Mr. Bain's personal ability to weld. As he says—"The small shop without elaborate power equipment can do many things with heavy gauge materials, if the contractor knows arc and flame welding."

Mr. Bain opened his shop about 15 years ago and, following usual practice, did architectural

sheet metal work, duct work, and the average run of job shop fabrication and repair. But as elsewhere, competition was keen and prices often none too profitable. Having an ability to weld, the Bain shop did quite a bit of repair and special fabrication for oil field concerns—especially in sheets too heavy for the job shop and not heavy enough for the boiler shop.

This experience led Mr. Bain, some seven years ago, to turn to specialty fabrication in 18 to 10-gauge material, especially items which could be welded in place of die work. The various items listed previously were developed one after the other.

The fabrication of 18 to 10-gauge material requires a power brake and power shears, but in the Bain shop most of the pieces are joined by



On these two pages are shown various parts, assemblies, housings of "mud-samplers." Everything is cut, formed and welded together in the Bain shop. Ten to 16-gauge iron is used; some machines are painted, some are galvanized. The wheels are shop-made as described in the text. Welding, used to join pieces together, provides unit construction as strong as expensive die work.

welding, rather than forming. This is indicated clearly in the items made in the Bain shop shown in the pictures.

#### Many Types of Machine Guards

The specialty of longest standing and steadiest production is machine guards. These range from guards a few inches in diameter on the large end to guards 10 and 12 feet long and proportionately wide. Sixteen to 10-gauge black iron is the usual material. Since oil field guards are used to protect equipment, Bain makes few expanded metal faced guards; most guards having a solid sheet face and solid edges, with access doors where required. The usual guard is made by cutting the face and welding the edge strip to the face. Necessary straps, hold-downs, etc., are also welded to the body. The sheet is cut and formed in power shears and rolls in as few pieces as possible. On work of this sort Bain uses a 75-amp. welder. Bain fabricates as many as 300 guards of one size a year.

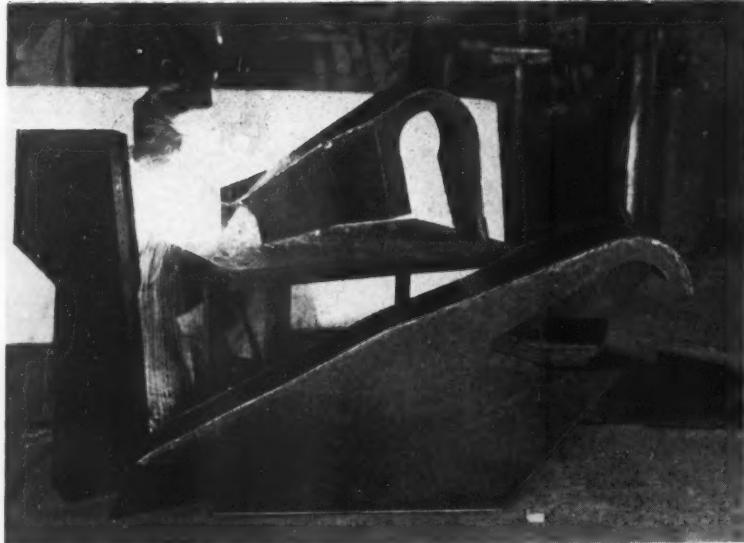
Mud from a well being drilled is "sampled" to

test for approach to oil. Formerly this sampling used to be done intermittently and by hand. But a "mud sampler" was patented to do this automatically and continuously. Bain makes these samplers as one of the photographs shows. The housing is 16 and 10-gauge black iron; pieces are cut on the power shear or by a gas torch for intricate contour and again all pieces are joined by arc welding.

#### Mud Sampler Construction

The wheels, through which the material passes for sampling, consist of one circular spider and one-piece blades formed as shown in the photograph. The blades are held to the spider by riveting and welding, as can be done best. Bain does not finish these machines, excepting those which are galvanized. The galvanizing is done after partial assembly. The shop has produced as many as 36 of these machines in a year, all on order.

Engines (gas and Diesel) are used extensively in the oil field, and these engines should be pro-



The machine guards shown left and below were among the first items manufactured in the Bain shop. Ira Bain, shown welding in the photograph, and his personal ability to weld, was and is the key around which the operations described function. Guards range from small to very large, but are mostly heavy gauge and solid for severe service.



tected. Since not all engines come in a housing, Bain has developed a type of housing (see pictures) which can be used with most engines and still be fabricated from parts pretty much standard. The radiator shell with protecting grille constitutes one piece formed by welding. The base is formed in 10-gauge iron, channel shaped, and needs no angle iron framing. An end section, also with grille, completes the framework on which the top and side cover are built. The usual housing has the four doors shown to give complete access to the engine. Bain has made these housings for almost every size of engine.

#### All-Welded Sign Shows Promise

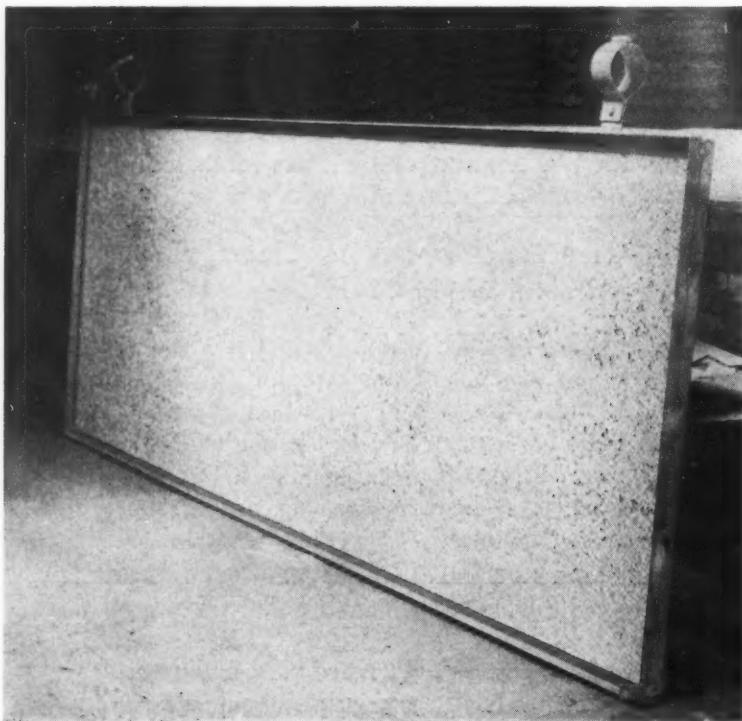
An item which "looks good" but is only in the experimental stage is the all-welded sidewalk sign.

The sign is made to hang on a pipe over the sidewalk; the pipe supported by the usual chains. The feature is the construction, which is shown in a picture. The galvanized sheet is framed with back-to-back angles. The sheet is spot welded to the angles at frequent intervals and the angles are tack welded together along the outside edge with tacks about 8 to 10 inches apart. This gives a perfectly smooth surface for the sign and a frame which cannot come apart.



The all-welded store sign (left) shows promise. The galvanized iron field is spot welded between the angles of the frame as shown.

The oil field engine housing shown below is protected by the special weather-proof housing developed by Bain. Parts are fairly standardized despite great variation in engine size.



# The Flame and the Weld\*

THE importance of proper flame adjustment in oxy-acetylene welding and cutting is readily apparent when it is realized that the sole purpose of the various items of equipment used is to enable the operator to produce and control at will an oxy-acetylene flame of the size and character best suited for the work at hand.

One unique feature of the oxy-acetylene flame is the fact that its chemical characteristics, and consequently its action on molten metal can be varied over a wide range. Determination of these characteristics is brought about by the relative proportions of oxygen and acetylene in the mixture which burns at the blowpipe tip. This proportion is accurately controlled by the blowpipe oxygen and acetylene valves. The blowpipe valves are not simply shut-off valves to provide a means for turning the gases on and off; they give the operator



Fig. 1—The neutral flame has an approximately one-to-one mixture of oxygen and acetylene

complete control of the flame adjustment at all times.

Once the blowpipe has been lighted in accordance with the manufacturer's directions, the flame must be properly adjusted before the operator can proceed to weld. To accomplish this, the operator, in addition to knowing the composition of the metal on which he is to work, must be familiar with the different types of oxy-acetylene flame adjustments and the methods of obtaining them.

## Three Types of Flame

Actual choice of the flame adjustment is dependent upon the composition of the base metal or upon the welding method which the operator desires to use. The accompanying table will serve as a guide in the choice of welding methods, rods and fluxes, and in the determination of proper flame adjustment for a variety of commonly used commercial metals and alloys.

Of the three types of flame adjustments listed in this table, the neutral flame is of particular importance to the operator because it is used for a wide variety of welding (and cutting) operations. It is also important because it always serves as a basis of reference in establishing an oxidizing flame, and

\*Reprinted by permission from "Oxy-Acetylene Tips" for November, 1939.

is often established before adjusting to a carburizing flame.

### Characteristics of Neutral Flame

The neutral flame occurs when an approximately one-to-one mixture of oxygen and acetylene is lighted at the blowpipe tip. It is called a neutral



Fig. 2—This flame is variously called an excess acetylene, a reducing, or a carburizing flame

flame because there is no excess of either oxygen or acetylene. As is shown in Fig. 1, it has a characteristic appearance. There are two sharply defined zones. The inside portion of the flame consists of a brilliant white cone from  $\frac{1}{8}$  to  $\frac{3}{4}$  in. long, depending on the size of tip used, and surrounding this inner cone is a second larger cone or "envelope flame" which is only faintly luminous and which has a delicate bluish color.

### Characteristics of the Excess Acetylene Flame

When the oxygen and acetylene proportions are varied from the one-to-one mixture, a decided change takes place in the character of the flame. Slightly more than this proportion of acetylene in the mixture will produce a flame which is variously



Fig. 3—The oxidizing or excess oxygen flame is obtained by supplying additional oxygen to a neutral flame

called an excess acetylene, a reducing, or a carburizing flame. As shown in Fig. 2, this type of flame will be found to consist of three zones instead of the two which exist in the neutral flame. There still remains the inner cone and the bluish outer envelope, but between these, surrounding the inner cone, is an intermediate cone of whitish color. The length of this intermediate or excess acetylene cone

## Recommended Welding Methods, Flame Adjustments, Welding Rods and

METAL OR ALLOY	WELDING METHOD	FLAME ADJUSTMENT	RECOMMENDED WELDING ROD	FLUX
Aluminum	Fusion Weld	Carburizing	No. 23 Aluminum	Aluminum
Brass	Fusion Weld	Oxidizing	No. 25 M Bronze	Brazo
			No. 21 H.S. Bronze	Cromaloy
Bronze	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
	Fusion Weld	Oxidizing	No. 25 M Bronze	Brazo
Cast Iron, Gray	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
	Fusion Weld	Neutral	No. 9 Cast Iron	Ferro
Cast Iron, Malleable	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
Cast Iron Pipe, Gray	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
Cast Iron Pipe, Chromium-Nickel	Fusion Weld	Neutral	Same Composition as Base Metal	Ferro
Chromium-Nickel Steel Castings	Fusion Weld	Neutral	Same Composition as Base Metal	Cromaloy
Chromium-Nickel Steel (18-8)	Fusion Weld	Neutral	No. 28 Columbium-Bearing 18-8 Stainless Steel	Cromaloy
Chromium-Nickel Steel (24-12)	Fusion Weld	Neutral	Same Composition as Base Metal	Cromaloy
Chromium-Steel Castings	Fusion Weld	Neutral	Same Composition as Base Metal	Cromaloy
Chromium-Steel (4 to 6 per cent)	Fusion Weld	Neutral	Same Composition as Base Metal	Cromaloy
Chromium-Iron	Fusion Weld	Neutral	Same Composition as Base Metal	Cromaloy
Copper	Fusion Weld	Neutral	No. 19 Cupro	None
	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
Copper Pipe	Fusion Weld	Neutral	No. 19 Cupro	None

varies directly with the amount of excess acetylene in the flame.

The carburizing or reducing flame is used in welding steel by the Lindeweld process, in applying Haynes Stellite alloys, in fusion welding aluminum, Monel metal, nickel and some alloy steels, and for certain other applications.

### Characteristics of the Excess Oxygen Flame

At the opposite end of the flame adjustment range is the "oxidizing" flame which is produced when oxygen is in excess in the mixture. Its character-

istics are shown in Fig. 3. The oxidizing flame has the general appearance of the neutral flame but can be readily identified by its shorter inner cone which is "necked in" on the sides, is not as sharply defined, and acquires a purplish tinge as compared with the brilliant white inner cone of the neutral flame.

A slightly oxidizing flame is used for all bronze-welding and bronze-surfacing applications, while a more strongly oxidizing flame is used in fusion welding brass and bronze. In the latter case, the correctly adjusted flame is the one that will melt

## and Fluxes for Welding a Variety of Commonly Used Metals and Alloys

METAL OR ALLOY	WELDING METHOD	FLAME ADJUSTMENT	RECOMMENDED WELDING ROD	FLUX
Copper Pipe (Cont.)	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
Cromansil Steel	Fusion Weld	Neutral	No. 1 High Test Steel (up to $\frac{3}{16}$ in.) Manganese-Molybdenum Steel (over $\frac{3}{16}$ in.)	None
Everdur	Fusion Weld	Neutral	No. 26 Everdur Bronze	Everdur
Galvanized Iron	Fusion Weld	Neutral	No. 7 Drawn Iron No. 1 High Test Steel	None
	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
	Lindeweld	Carburizing	No. 32 C.M.S. Steel	None
High-Carbon Steel	Fusion Weld	Carburizing	No. 2 High-Carbon Steel	None
Lead	Fusion Weld	Neutral	Same Composition as Base Metal	None
Lead Pipe	Fusion Weld	Neutral	Same Composition as Base Metal	None
Malleable Iron	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze	Brazo
Manganese Steel	Fusion Weld	Slightly Carburizing	12 per cent Manganese Steel	None
Monel Metal	Fusion Weld	Slightly Carburizing	Same Composition as Base Metal	Brazo
Nickel	Fusion Weld	Slightly Carburizing	Same Composition as Base Metal	Brazo
Steel, Cast	Fusion Weld	Neutral	No. 1 High Test Steel	None
Steel Pipe	Fusion Weld	Neutral	No. 1 High Test Steel	None
	Lindeweld	Carburizing	No. 32 C.M.S. Steel	None
Steel Plate	Fusion Weld	Neutral	No. 7 Drawn Iron No. 1 High Test Steel	None
	Lindeweld	Carburizing	No. 32 C.M.S. Steel	None
Steel Sheet	Fusion Weld	Neutral	No. 7 Drawn Iron No. 1 High Test Steel	None
	Bronze-Weld	Slightly Oxidizing	No. 25 M Bronze No. 19 Cupro	Brazo None

the base metal and maintain a bright surfaced puddle which is free from film or coating.

### Adjusting the Flame

After the correct welding head or tip for the work at hand has been attached to the blowpipe and proper oxygen and acetylene pressures have been adjusted at the regulators (all according to the apparatus manufacturers' recommendations and instructions), it is a simple matter to obtain the desired flame adjustment. First light the blowpipe, with the blowpipe acetylene valve one quarter turn

open (if lowpressure open wide) and the blowpipe oxygen valve just slightly open. The acetylene will burn with a smoky yellow flame and will give off quantities of fine black soot.

### Excess Acetylene

Now open the blowpipe oxygen valve slowly. The flame will gradually change from yellow to blue and will show the characteristics of the carburizing or excess acetylene flame. There will be three distinct parts to the flame—a brilliant but feathery-edged inner cone surrounded by a second-

ary cone, and a bluish outer envelope forming a third zone.

Most medium-pressure blowpipes will produce a slightly carburizing flame at recommended gas pressures when both oxygen and acetylene blowpipe valves are wide open. If a greater excess of acetylene is desired at this point, close the blowpipe oxygen valve slowly until the secondary cone is of the length required. Conversely, to decrease the excess of acetylene in the mixture, close the blowpipe acetylene valve gradually until the secondary cone is correctly proportioned with respect to the brilliant and sharply defined inner cone. Carburizing or reducing flames are usually measured by the ratio between the length of the acetylene cone or "feather" and that of the inner cone, both being measured from the end of the blowpipe tip.

If any difficulty is encountered in obtaining the desired ratio between the lengths of the acetylene cone and inner cone, first adjust the flame to neutral, and then increase the acetylene until the desired ratio is established.

#### Neutral

To obtain a neutral flame proceed as above with an excess acetylene flame. Then close the blowpipe acetylene valve very slowly so that the secondary cone gets steadily smaller until it finally disappears

completely. Just at this point of complete disappearance the neutral flame is formed.

Because the difference between the neutral and the carburizing flames is much more readily apparent than that between the neutral and oxidizing flames, an adjustment of the flame to neutral should always be made from the excess acetylene side. In other words, first adjust the flame so that it shows the secondary cone of excess acetylene, then reduce the amount of acetylene until this secondary cone just disappears.

#### Excess Oxygen

If an oxidizing flame is desired, proceed as though adjusting for a neutral flame. Then, when the neutral flame is obtained, either increase the oxygen or decrease the acetylene until the correct amount of excess oxygen is noticeable in the flame. The amount of excess oxygen in the flame will vary inversely with the length of the inner cone as compared with that of the neutral flame. Therefore, the proper oxidizing flame can be easily recognized when the length of the inner cone has been shortened the desired amount. The more the inner cone of the neutral flame is shortened, the greater the excess of oxygen in the flame. In some cases, as in fusion welding brass and bronze, the exact adjustment has to be determined by the action of the flame on the molten metal.

## Artificial Coloring For Exposed Copper

COPPER may be given different finishes by the use of various chemicals. The most commonly known and used of these are set forth below.

Copper and Brass Research Association will be glad to suggest methods for special finishes.

#### Bronze or Brown

Clean off all dirt and traces of acid or other flux carefully. Give the cleaned copper a thorough coating of boiled linseed oil. Touch up the seams with copper bronze.

This can be applied with a mop or brush or with rags. This treatment makes the copper turn a dark brown color somewhat similar to old bronze.

How long this color will last, especially near salt air, is problematical. There are examples of it six or more years old. It is best to renew the treatment every two or three years unless the atmosphere is generally clear and dry. By this means it is possible, after a few treatments, to retain the color permanently.

A more elaborate method is:

Clean the copper thoroughly with a strong soda solution (4 to 6 ounces per gallon of hot water) or with fine pumice and kerosene and then wipe it off with gasoline.

Apply with a brush a solution of 1 ounce of liver

of sulphur in one gallon of lukewarm water.

After the desired color has been obtained wash the solution off with water.

The above formula should be first tried out on a small piece of copper. If the color obtained the first time is not satisfactory it may be advisable to give a second coating of the solution.

#### Green: Verdigris; Copper Patina

Clean the copper thoroughly with a strong solution (4 to 6 ounces per gallon) of soda in hot water. Wash this off with clean hot water.

Apply with a brush a solution of  $\frac{1}{2}$  lb. of salt to 2 gallons of hot water. Let stand for one day and then sprinkle the surface with clean water.

It is absolutely necessary for good results that all the grease and oil of the manufacturing process be removed from the copper. The strong soda solution will do this. Uniform finish will not be obtained unless the copper is thoroughly cleaned.

Copper left to the action of the atmosphere will eventually turn green, the color of copper carbonate. It first darkens, then becomes a dull black (the oxide); finally the oxide changes to the carbonate which is the well-known patina of copper. This carbonate is a protective coating and should not be removed.

# RIGID SPECIFICATIONS\*



\* Specifications covering the material, manufacture and tests for only 4 of the 15 patterns of Crestoloy Pliers require 10 sheets.

## GUARANTEE THE QUALITY OF CRESTOLOY PLIERS



Cutter testing on production basis. Every Crestoloy Plier must also pass rigid strength tests.

Crestoloy Pliers take all the guesswork out of plier *buying*, because Crescent has taken all the guesswork out of plier *making*! Rigid specifications, first of all, establish the material, design, workmanship, tests and inspection of these better tools, right down to the minutest detail. Strict adherence to these specifications is maintained by continuous tests, and relentless inspection of the individual tools. Only those pliers that are 100% perfect receive the blue and silver Tag which identifies every genuine Crestoloy Plier.

Crestoloy Pliers are made in 15 different types. They cost little, if any, more than ordinary pliers and are sold by hardware dealers everywhere. Write for our latest catalog describing Crescent's full line of guaranteed tools.

CRESCE<sup>N</sup>T TOOL COMPANY

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**CRESCE<sup>N</sup>T** and Smith & Hemenway **TOOLS**

**COST OF NEW HOME  
\$8,000.  
and 75 cents!**

The 75¢ paid for  
permanent rust resistance  
in the duct work

YES, that's all it costs in the average 6-room house—75 cents more to build the duct work of U·S·S Galvanized Copper Steel. The price of a dinner or a taxi ride will buy steel that has 2 to 3 times the rust resistance of plain steel! Then you can be sure your jobs will not rust-out because of high humidities, condensation or smoky air.

Many heating contractors and furnace builders are using U·S·S Copper Steel as an added sales feature. Building owners are quick to see the necessity of greater rust resistance for humidified air heating systems.

Look at the corrosion chart in this advertisement. Twenty-one years of painstaking tests have definitely established the superiority of U·S·S Copper Steel.

In the shop, U·S·S Galvanized Copper Steel has other advantages. It is soft and ductile, can be fabricated quickly. Sharp turns and intricate shapes are easy to make. Spoilage is reduced. This means actual dollars and cents savings.

The cost of U·S·S Copper Steel is so low and its added advantages so important that it deserves serious consideration for every air conditioning job. We'll gladly show you how others are using copper steel —just write.



**HERE'S THE PROOF!  
UNCOATED COPPER STEEL  
91% SOUND AFTER 21 YRS.**



This chart compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of tests carried on at Annapolis, Md. from 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated). Other materials were decidedly inferior.



## GALVANIZED COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago  
COLUMBIA STEEL COMPANY, San Francisco  
TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors  
United States Steel Export Company, New York

**UNITED STATES STEEL**

# BOOKKEEPING—

## *The Little Things in Business*

By Joseph G. Dingle

C. P. A., Ottawa, Ill.

IN OUR previous articles, we have discussed the need of good records in business, the value of a good bookkeeper, and the many forms in which your money may be found from time to time. Before entering upon the discussion of bookkeeping in detail we want to prepare you to properly appreciate the necessity of good records and a competent bookkeeper. A competent and intelligent bookkeeper can do more than keep your books. In this article, we want to discuss at some length some of the "little things" in the daily routine of a typical business and point out their effect on the prospective customer.

We feel that if all the "little things" are well cared for at the proper time the business as a whole will be found to be well taken care of. Business, after all, is but a conglomerate mess of small and insignificant things, but when properly put together into a completed whole, it is something worth crowing about. Nothing succeeds like success and the best way to obtain success is to watch the little things which escape the other fellow's attention. You may never know just what this procedure will do for you, but suffice it to say that you will have a successful business if you lose no opportunity to do the little things well.

### Is Your Shop Clean and Comfortable?

What is the first impression a prospect or customer gets on coming into your shop? Does it appear neat and clean? Does it look like a successful business? What greeting does a prospective customer get? Remember this fellow who has just walked into your shop is not looking for a suit of clothes. He came into your shop for a purpose and it is up to you to see that he is made to feel that he is among friends. A poorly arranged and poorly cared for shop admits either inefficiency or failure, while a neat, clean shop, with a suitable place to entertain a prospective customer, will indicate in no unmistakable manner that you are expecting just such a prospect and have made all arrangements to properly take care

of his wants, even his personal comfort while he is in your place of business. You, of course, may be in working clothes. A little dust or dirt more or less is of no importance, but perhaps the prospective customer is a lady, dressed for the street. Dust and dirt are not acceptable to her and she cannot help but be influenced by such surroundings.

### Who Greets Your Customer?

Let's suppose you are busy in the shop and a prospect comes in your front door. Is there someone to greet that prospect in a friendly manner, ascertain what they are looking for and to call you from your work if it is necessary? What is your manner of approach? Do you indicate by your actions that you hate to be interrupted for the mere purpose of talking to a prospective customer, or do you proceed with all your power to make that prospect feel that you are glad he or she dropped in and that you have nothing in the world to do except to learn his or her wishes and perform them to the best of your ability.

Of course, I can hear some of you saying that your shop is not a drawing room; that your customers do not expect to be entertained with a pink tea, and all that sort of stuff. Of course they don't, but did you ever go into some fellow's place of business, as a prospective customer, and find such a cordial greeting that you felt at home and comfortable right away? What did you do in such a case? If you went in there, you were looking for something in that fellow's line, and as soon as you felt at home you felt like giving him the benefit of the doubt and buying your requirements without further shopping around. If he knew enough to make you feel at home, you felt sure he knew all about his line of merchandise and you had confidence in his recommendations.

If you are a typical small business man, your work will require that you be out of the office much of the time. You may be in the shop at work, but what about that telephone? Do you

have someone whose principal duty it is to answer that phone promptly and intelligently? Perhaps you are one of those fellows who claim that their business is "too small" to have all those frills. Barring a mistake at the telephone office, the ringing of that phone indicates that someone, unknown until you have answered, is desirous of talking with you. A long delay in answering a phone gives the caller an opportunity to wonder about the efficiency of your organization. A prompt reply indicates that you are receiving many telephone calls and are equipped to give them attention.

#### Telephone Etiquette

Answering a telephone is an art. If you don't believe this, just watch the methods used in answering the calls you make. On some calls, you will have to wait a while and then some "dumb dora" will say "hello." This tells you nothing, so you have to inquire if you have the desired number and then if you may talk to the desired party. On other calls, you are greeted promptly with a cheery repetition of the number you called, thus assuring you of the correct connection, and upon expressing the wish to talk to some certain party at that phone, you receive an intelligent and courteous reply. If the party is available you have quick connection; otherwise, you are asked to leave a message and in the very manner of asking, you are made to feel that any such message will be promptly and efficiently attended to. Listen to the answering of your own phone and see if it is being done as you would like it. Remember that the party calling your number may be a stranger to you, yet desirous of having business dealings with you and the first word spoken into that telephone may make or break that sale.

#### "Dumb Dora" Assistants

Does the party in charge of your shop and office, in your absence, know enough of your business to be able to intelligently receive callers, either in person or on the telephone? Remember, the prospective customer expects some intelligence in the party who represents you and will judge you accordingly. If you have not provided that kind of an assistant to represent you in your absence, the natural inference is that you are like your representative and perhaps it would be better to go to some other shop for the service desired. In such a case, you may never know just what that "dumb dora" cost you for you will not even know the name of the prospective customer who on finding your representative uninviting, walked out of your shop and into that of your competitor. On the other hand, if well greeted, the average customer will react favor-

ably and you will have an opportunity to contact the prospect later. That comes from having a good representative in the shop at all times during the business day.

What is the routine for handling telephone messages or orders that come in during the day, either by phone or in person? Unless some good routine is used many of these orders will be mislaid, or forgotten, and the customer will be dissatisfied with the service of your shop. A good plan is to have a suitable daily blotter handy to that telephone on which all messages are promptly written. This blotter should receive your frequent attention and your office attendant should be encouraged to call your attention to matters recorded there. If an order is taken, it should be promptly placed on a proper order form and then put in line for attention in the shop. A suitable order blank, preferably in duplicate, should be used, one copy to remain in the book and the other to be torn out and placed in work.

#### Routine Your Paper Work

What routine is followed in billing customers for work done, or merchandise delivered? If your shop is a small one, you perhaps have a cash drawer in which is kept the change fund and any sales for cash are merely evidenced by the increased amount of cash in the drawer. Is there any method to record what was sold and to whom? In an ordinary retail establishment, the treatment of a cash sale may be casual, but in a shop such as yours, it may be well worth your while to know who has been in and what they bought. It might be a clue to something bigger and the best way to obtain this information is to treat the sale with some dignity and make a bill for it, thus obtaining for your record the name and address of the customer and by giving the customer a receipted bill, you will get your name and business before them a little more forcibly than otherwise. Perhaps, when again in need of something in your line, you will have a better opportunity of obtaining his business.

After a job has been landed, what steps are followed to keep up with the flow of material, labor and other expenses into the installation of the work? Herein lies one of the most important steps of the business. You have a job to do; it's up to you to know that it is being done the way it was ordered and that you are protecting yourself in seeing that proper record is made of all elements of cost going into that job. Material tickets are vitally necessary and unless your shop is large enough to warrant a regular man to attend to the receiving and issuing of materials, supplies, etc., you must see that each workman in the course of his work properly records the material he has taken from the racks or bins

and used in the performance of each and every job. Where two or more are on the same job, each may think the other has made the material ticket and thus neither would attend to it. A proper routine is to make the senior man on the job responsible for the proper execution of all material tickets.

Time reports are essential to the proper costing of the work done. This is one of the major sources of cost in any business. Now that we have so many labor laws, each requiring some sort of a report and most requiring a tax payment based upon the amount of wages paid, labor records are today one of the most important records in any shop. Under existing labor laws, it is required that an employer be prepared to present to government agents full and complete pay roll records for the past four years. There are the field men for the Federal and State Unemployment Compensation laws; the Wages and Hours law; the Old Age Benefit law; and then, too, there is the pay roll auditor for the insurance company which covers your Employer's Liability. When you lay off an employee, you will be called upon to furnish data pertinent to his unemployment compensation. You will be required to produce data in support of his old age benefits and many other forms of data. Good labor records will currently compile this information and thus save a great deal of extra work in the years to come when you are called upon to furnish data. Nothing so upsets an employee's loyalty as to have frequent errors in his pay envelope. Some don't mind an overpayment, but all will object seriously if there is an underpayment. The overpayment is at your expense; if you know nothing of it, it is too bad.

#### Estimating for a Profit

What about your estimates? Do you use a property estimate blank, in which you build up your cost for proposed work and do you preserve these records for future use? We believe it good policy to show some respect for an invitation to submit a price on proposed work and one of the best ways to show this respect is to submit a written estimate of the job. On this estimate you have an opportunity to show just what you propose to do and the price you are asking for the job.

There is a difference of opinion on the subject, but we feel that a bid that fully and frankly states what is proposed to be done and the material proposed to be used is the best policy. Some contend that it gives your competitor a chance to cut the quality of the materials and thus underbid you. Frankly, we are of the opinion that the shop man who proceeds on the theory that he knows the requirements of the job and proposes to use such materials and such labor as best will

suit those requirements is doing the customer a favor. How many customers really know anything about the technical side of the sheet metal business. Is it not good practice to assume that you, an experienced shop man, know something of the technical side of the business in which you are engaged and offer to help your customer get a good job at a reasonable price. Cheap, shoddy material consumes labor as rapidly as does good material and the cheap material requires replacing so much sooner, that it is in the end much more expensive.

#### Do Customers Want Something for Nothing?

Some years ago we installed a set of accounts in a small shop and as an incident to getting the office off to a good start, we computed the overhead for several years prior to the date of installation and suggested that the proprietor use that as a basis for figuring until we had established the actual overhead from accurate records. Shortly thereafter, he was asked to submit a bid on some work. He first computed his material costs, then his labor costs, then added the required overhead percentage, and his profit. When he submitted his bid, he was told he was too high. that another fellow had submitted a price of a certain amount.

Our client promptly told the prospective customer that he could not buy the required material for the price the other fellow had offered to do the job for; that his labor costs were approximately so much, and that his overhead was, as computed by us, a certain percentage of the labor and material cost. This customer, not wishing something for nothing, stated to our client that he could have the job at the higher price, with the understanding that if, when the job was completed, he found that he had made more profit than he had estimated, he would make a suitable adjustment in the price to the customer. Here was an ignorant competitor trying to give a customer somebody else's money, yet the customer refused to accept the gift and gave the business to the man who frankly admitted that he knew his costs and wanted a price for the work which would not only cover those costs but a reasonable profit besides.

That is what the average business man is in business for—a profit—and it is not a disgrace to admit it. The typical customer is willing to pay for what he gets; he expects to pay all costs and a reasonable profit; but he has found that far too often the contractor does not know his costs and is merely guessing. An ignorant competitor is a dangerous competitor. He is not only willing to give somebody's money away, by taking work at a figure below cost, but by so doing, he makes

(Continued on page 125)

# The PROBLEM CORNER

## Testing Heating Plant in Summer

American Artisan:

Where a heating system is installed and completed during the summer months, it frequently is necessary to run some sort of test to prove that the system will heat the house under winter conditions. Isn't there some table which shows room air temperatures for various outdoor temperatures (summer conditions)?

G. S. O., Maine.

Reply by

G. A. Voorhees  
The Furblo Company.

Various tables and rules of this kind have been published from time to time.

In Allen and Walker's "Heating and Ventilation" the mathematical basis for the development of such a table is given and from this explanation it is quite evident that the construction of any such table is based on steam condensation in a direct radiator and it varies with steam pressure and with the coefficient of heat transmission of the particular radiator which is used. So far as I have ever been able to learn, there is no mathematically correct basis for the development of a similar table which is properly applicable to heating by means of warm air circulation. On the other hand, I think that all of us who have had some years of experience in warm air heating work have had occasion to test out a plant in a given building at an outside temperature higher than the outside temperature on which plant design was based and at which a given room temperature was guaranteed. I know that when I have fired a plant and made a preliminary test with an outside temperature of about 30 or 40 degrees, I have sometimes been worried for fear the plant might not maintain a 70 degree temperature in zero weather without "forced firing"—yet when the zero weather finally arrived, the plant carried the load very nicely.

I've never been able to account for this to my own satisfaction. It's true that the intensity of Chimney draft increases as the weather gets colder and consequently a higher combustion rate can be maintained in zero weather than would be expected at a temperature of 30 or 40 degrees above zero. Yet, in the admittedly crude tests that I made, and where draft gauge readings were taken, I was never able to satisfactorily correlate the respective heat deliveries with the corresponding draft gauge readings.

I did work out a sort of formula for my own guidance for use in testing where the plant was designed on the basis of an inside temperature of 70 degrees and an outside temperature of zero. It seems to work out reasonably well when tests were made at outside temperatures ranging from about 10 degrees above zero up to outside temperatures of about 50 degrees.

That formula was as follows:

$$T_i = 70 + 0.8 T_o$$

in which

$T_i$  = room air temperature under test conditions  
 $T_o$  = outside temperature at time of test.

I'm not recommending this formula for your use—I'm only offering it for what it is worth—if anything.

Just for comparison I give the following tabulation showing the comparative room air temperatures corresponding to certain outside temperatures as given for two-column and three-column steam radiators by Allen and Walker, as given by Platte Overton in his very practical "Forced Air Heating" and a partial tabulation of the room temperatures that would result from applying the formula that I have suggested above.

ROOM AIR TEMPERATURE DURING TEST

Outside Temp. During Test	2-column Radiation According to Allen & Walker	3-column Radiation According to Allen & Walker	As given by Platte Overton in "Forced Air Heating"	According to Suggested Formula
-30	52.0	53.0	..	..
-20	58.0	59.0	..	..
-10	64.0	64.0	..	..
0	70.0	70.0	70	70
10	77.5	75.0	75.1	78
20	83.0	83.0	81.0	86
30	90.0	89.0	86.5	94
40	97.0	95.0	93.1	102
50	103.5	101.5	98.7	..
60	110.0	108.0	104.7	..
70	117.0	115.0	..	..
80	123.5	121.5	..	..

## Labor and Material for Tin Roofing

American Artisan:

We would like to have your estimate covering labor and material required to install a flat tin roof on a building 63 by 114 feet in area, with 291 feet to be flashed into brick. Also flashing around two skylights, each 8 by 6 feet 6 inches and a flue 18 by 18 inches. How far into the brick joint is it customary to insert tin flashing and what will be the approximate amount of solder required?

J. R. C., Iowa.

Reply by  
The Editors

Regarding the tin roofing, three old-time sheet metal contractors in Chicago, who have done a lot of tin roofing and still do some small volume of tin work report that they estimate a requirement of 6 pounds of solder per 100 sq. ft. of flat locked and cleated tin roofing when the tin sheet measures 14 x 20 inches. If 20 x 28 inch tin sheets are used, the amount of solder required is approximately 4 pounds per square foot.

Both of these figures assume that all seams will be thoroughly sweated and a first class job will be done.

According to your dimensions, you would have approximately 72 squares of roofing and will need around 430 pounds of solder.

Tin flashing is customarily handled in the same way as galvanized iron or copper flashing and where the rising wall is brick, the cap flashing is inserted the depth of one brick course and turned up behind the brick for approximately  $\frac{1}{4}$  to  $\frac{1}{2}$  inch.

As to labor, these old time tinners say that one man and a helper familiar with laying flat seam roofing, whether tin or copper, are figured to lay, cleat and solder  $1\frac{1}{2}$  squares per day. Inexperienced mechanics would probably not do better than one square per day. This does not include any labor time for turning the seams in the shop.

We can give you no information on the flashing around the skylight and flue as we do not know just what type of skylight is being used and how you propose to flash the base.

# The Problem Corner

## Woodwork Dries Out

Question submitted to and answered by Research Residence staff and published here in interest of the industry.

### Question:

We have a problem that we cannot correct to the satisfaction of our customer.

Our customer, one of our prominent doctors, built a new home about two years ago. It is a nine-room house constructed of stone. Storm doors and windows have been installed in living and dining rooms, the kitchen and breakfast nook having single panes. None has been installed on second floor windows. The wood in this house is drying out and pulling apart. During the winter there are cracks of at least  $\frac{1}{8}$  inch in the wooden cove mouldings at ceiling line. During the course of the summer these close up.

In an effort to solve this difficulty we sold him a spray type humidifier. This was installed about February 15, on an automatic gas winter air conditioner. Our equipment registers about 40% humidity and has been as high as 50%. He has a cheap humidistat located in the living room which never registers more than 15% to 18%. The doctor is inclined to believe our equipment is not working correctly and that he is not getting sufficient humidity because there is no apparent improvement in the condition of the woodwork. There is no indication that the cracks are closing up.

Although we have had a severe winter, this equipment was installed at a time when the temperature had moderated. The furnace has a capacity of 240,000 Btu input. In an attempt to make the equipment work satisfactorily, we cut the input down to 120,000 Btu with one burner operating. That night the temperature dropped to 15° above zero. When the job was checked the following day, we found our humidistat would cut out the spray when it was set below 40% relative humidity. We cannot convince the doctor he is getting 40% humidity because there was no moisture on the single pane windows. The windows are steel casement type.

Just what can be done to remedy this situation?

### Reply by S. Konzo, University of Illinois

I have studied your inquiry of April 27, 1940, and it seems to me that the following comments may be of some interest:

(a) In the first place I note that there is disagreement as to what the actual relative humidity is in the house. The doctor says 18%, you say 40%. It seems to me that this matter should be settled first.

Can you get hold of a sling psychrometer? If not I suggest that you take a fairly reliable thermometer and attach a strong cord to the top end so that it can be swung freely. Take a reading of the room air with the bulb dry, preferably after swinging the thermometer. This gives the dry bulb air temperature, D.B.

Then attach 2 layers of cheesecloth over the mercury bulb, wet the cloth in distilled water, swing the thermometer until the temperature reaches its lowest value. This gives the wet bulb, or W.B. reading. The difference between DB-WB is called the "depression."

Look up on page 49 of "Winter Air Conditioning" or a similar table the true relative humidity. If for example:

$$\begin{aligned}DB &= 72^\circ \\ WB &= 57^\circ\end{aligned}$$

$$\text{Depression} = 15^\circ$$

on page 49 follow across on the 72 line until you reach column 15 and the value of 38% is the true relative humidity.

There is no more accurate method than the above.

I would not trust the readings obtained with cheap humidistats. Even the more reliable hair type hygrometers need an occasional check up and re-setting.

- (b) On a 15° outdoor day, for single pane windows, condensation will appear when the humidity exceeds 22%. If no moisture appears on the single pane window I am inclined to believe the actual humidity was less than 40% and that the humidistat was cutting off the spray before an actual 40% was reached. Please refer to bottom part of the figure shown on page 68 of Winter Air Conditioning.
- (c) If the house is equipped with single pane windows and the walls are not protected with a vapor barrier (See p. 71 in Winter Air Conditioning) we do not recommend humidities much in excess of 40% in 40° weather and over 25% in zero weather. If the house is completely protected with storm sash and vapor barrier a value of 40% can be maintained even in zero weather.
- (d) Quite frequently, particularly when houses are finished up in summer, cracks will show up in the woodwork because the wood trim was finished when the humidity was between 60% and 80%, which is normal for summer, and is then exposed to humidities as low as 30% in the heating season. There is really little that can be done about it. Houses finished up in winter with artificial heat in use and with the house allowed to thoroughly dry before the wood trim is installed have far less trouble from this source.

Some types of woods, of course, are subject to shrinkage more than others. Wood shrinkage is the responsibility of the general contractor. The heating contractor should not guarantee that the cracks will close up, because the usually acceptable humidities of 30% or 35% may be far less than the 60% to 80% required to close the cracks.

## Condensation on Windows

### American Artisan:

We have a problem of condensation forming on the windows of a house heated with a gravity warm air furnace. The windows and doors are weather-stripped, but there are no storm windows. There is a door at the second floor landing and the owner keeps this door closed in cold weather, but all windows of second floor bedrooms are opened at night. There is no cold air return from the second floor and the condensation seems to collect on second floor windows more than it does on first floor glass.

J. M. S., Ohio

### Reply by The Editors

Condensation on windows is a tricky problem and moisture rising into the air of a house from any one point will very rapidly permeate all the air in the house, so that even though moist warm air is entering the house on the first floor only, you will probably find the same percentage of relative humidity on the second floor as you find on the first floor even though the door between the two floors is closed.

The only solution to condensation on windows is the use of storm sash, tight fitting.

If the owner opens the upstairs windows, the second floor rooms are pretty cold and the air coming from the registers quickly cools, and therefore, can not carry the percentage of moisture which is being put into the air. This moisture condenses on the colder surfaces which are undoubtedly the glass in the windows.

Our only suggestion is that if the owner opens the windows, he should also close all second floor registers. This might eliminate some of the condensation, but probably will not eliminate all condensation.

# Association ACTIVITIES

## Coming Conventions

1940

Dec. 10-11—National Warm Air Heating and Air Conditioning Association. 27th Annual. Committee Meetings on the 9th. Hotel Statler, Detroit. George Boeddener, Man. Dir., 5 E. Long St., Columbus, Ohio.

1941

Feb. 10-12—Sheet Metal Contractors Association of Wisconsin, Inc. Annual. Hotel Pfister. Paul L. Biersach, Secretary.

## National

For the 27th annual convention of the National Warm Air Heating and Air Conditioning Association, the Hotel Statler, Detroit, has been selected and the dates are December 10th and 11th, 1940. Committee meetings on the 9th.

Attached to each announcement is a return postal soliciting subjects of interest, with space for the names of the speakers and their complete address.

There will be an open forum. "In this big OPEN FORUM HOPPER, the best brains of the industry are going to toss in their ideas, plans, and offer suggestions and give information and ask questions from the floor. And a committee of six—your committee—right from the platform, is going to answer the questions and take down information."

Members are invited to list on the unsigned postal the names of six men to sit on the OPEN FORUM COMMITTEE of six. The man with the most votes will be appointed chairman.

The Board of Directors at their next meeting will be guided by the (unsigned) votes.

Professor Konzo is working on the final draft of the Yardstick before presentation to the Joint Committee and before it can be submitted to an industry meeting to be called by the U. S. Bureau of Standards in co-operation with FHA. After the industry meeting it will be submitted to your Board of Directors for approval, printed and distributed at the annual meeting in Detroit.

George Boeddener, Man. Dir. and Treas.

## Atlanta, Georgia

The activities of the Warm Air Heating Contractors' Association of Atlanta, Inc., for the last several months have been mainly concerned with getting the City of Atlanta to pass a smoke abatement ordinance. This ordinance was finally passed by the City Council, and called for the appointment of a full-time engineer with a complete staff of assistants. It will now be necessary for all heating concerns to submit a layout to the City Engineer prior to installation and an inspection will be made after the installation to make sure that the installation was properly made.

In addition, the association is trying to get the city to pass a Code regulating the design and the installation of heating systems.

Due to several large air conditioning installations made recently and due to seven large Government Housing Projects in the course of construction this year, there has

been very few, if any, capable sheet metal mechanics out of work in this area. Individual contractors hire men as helpers, who later become mechanics in that same organization, or in others, depending on the amount of work being performed.

There has been a large number of homes built in Atlanta this past year and at present the number of buildings seems to be about the same as it has been throughout the spring and summer. Some residence builders, however, have curtailed their activities considerably due to the war scare. The majority of homes built are in the low-cost class—\$3,500 to \$5,500. Atlanta has had very few homes in the \$2,500 to \$3,500 class that have had anything approaching an adequate heating system installed. In general, the low-cost homes are installing gas-fired floor furnaces, gas-fired gravity, coal-fired gravity and in some cases, gas-fired hi-boy furnaces. Cheap as these systems are, most of the builders feel that they are too expensive for the extremely low-cost homes which the FHA has been stressing.

The following are the officers for the current year:  
President—Walter Paine, c/o Paine Heating & Air Conditioning Company, 430 Superior Ave., Decatur, Georgia.  
Vice-President—Boynonton Cole, 1873 Piedmont Ave., N. E., Atlanta.

Secretary—W. F. Patrick, c/o The Murray Company, P. O. Box 1517, Atlanta.  
Treasurer—Jim Austin, c/o Moncrief Furnace Company, 676 Hemphill Ave., N. W., Atlanta.

New officers will be elected for 1941 during the month of January, 1941.

W. F. Patrick, Secretary.

## Detroit

The Detroit Association of Warm Air Heating and Air Conditioning Contractors, Inc., continues very active and has two main objectives at present. The supreme effort will be in company with the State association in an effort to get suitable state legislation. A tentative bill is being drafted. The other main objective is the compilation of a complete set of estimating units for all classes of furnace work. Gravity repairs have been covered so far.

The association has a credit reporting service for members and is carrying on several other minor activities.

Officers are:  
President—Ernest C. Simmons, North End Stove Co., 8419 Brush Street.  
Vice President—Hal H. Simmons, A. A. Hare Co., 202 E. Elizabeth.

Secretary—Bob Clark, J. S. Clark Co., 528 E. Milwaukee.  
Treasurer—Raymond Zick, 23768 Michigan Avenue, Dearborn.

The residential building situation is good, with a considerable amount of low-cost housing. The labor situation is fair, with the possibility of a shortage if business really starts to move.

We have an excellent building trades school here conducted by the city and the course is very practical.

N. J. Biddle, Executive Secretary.

## Pennsylvania

M. F. Liebermann of Ambridge has returned to his business after his recent illness. He was present at the annual convention in Harrisburg and was re-elected to another term as secretary of the Sheet Metal and Roofing Contractors' Association of Pennsylvania.

A. J. Sabathné, President.

## Association Activities . . .

### New York

The New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., announces their annual convention to be held the last week in March at Syracuse, N. Y., in the Onondaga Hotel. Exact date will be announced later.

At the State Board of Officers meeting held in Syracuse on August 14th, it was definitely decided to start formation of the Group Compensation for New York State. The group will be managed by a licensed group manager, and the contract for managing the group was awarded to Laverack & Haines of Buffalo, N. Y., who are now managing several other New York State groups.

The following members of the New York State association were elected by the directors to take care of the formation of this group in conjunction with Laverack & Haines of Buffalo:

Clarence J. Meyer, Chairman, 569 Genesee St., Buffalo.

William Schmitt, 60 Brown St., Rochester.

Henry Steinhorst, 612 South St., Utica.

Arthur Heaphy, 133 N. Geddes St., Syracuse.

Patrick Varden, 175 Watervliet St., Albany.

H. A. Daniel, 134 Washington St., Newburgh.

The group manager is now working on the set-up for this group and expects to have it in operation within sixty days.

Clarence J. Meyer, State Secretary.

### Michigan

The summer activities of The Michigan Sheet Metal and Roofing Contractors' Association have had to do with the forming of local associations in more or less key cities. The state was divided up into four areas as follows:

West State—Grand Rapids and vicinity.

North State—Saginaw and vicinity.

Central—Lansing and vicinity.

East State—Detroit and vicinity.

A date was set for a meeting in each of these areas and so far as possible an invitation to attend was sent to each warm air heating concern in the area. The attendance varied from fifty odd to over a hundred.

Local associations were set up and each area elected a chairman and a delegate. These representatives meet with the State Chairman of the Warm Air Division of the State association and conduct the business of the Warm Air group. The vital business before the group at this time is the working out of a proposed "code" to be submitted to the State Legislature next year.

Mechanics are rather hard to find and nothing much is being done about apprentices. The association does boast the course offered by the Michigan State College, the Industrial Training Institute of Chicago and the Grand Rapids University.

Figures are not available on the number of low-cost houses being erected, but there are a great number of them going up all over the state.

E. C. Spraker, Secretary.

### Merchandisers, New York

The Merchandisers held their Midsummer Meeting and Outing at Drumlin's Golf and Country Club, Syracuse, N. Y., Wednesday, August 14. We had a total attendance of fifty which comprised both Members of the "Merchandisers" and members of the State Association, whom we had invited. This country club is exceptional for an outing of this kind inasmuch as in addition to a well equipped club house there are facilities for golf, baseball, lawn bowling, quoits, and as a matter of fact about everything but swimming.

The program included lunch, followed by a short business meeting with golf and other sports in the afternoon.

In the evening there was a banquet attended by forty-four persons. There were a few short speeches by officers of the "Merchandisers" and by George Ballard,

president, and Clarence Meyers, secretary, of the State Association. Edwin A. Scott, Editor of Sheet Metal Worker and one of our members, climaxed a very nice talk by offering a prize of twenty-five dollars to the one securing the most new members between now and the date of our next regular meeting at the time of the convention in the spring.

Next in order was the awarding of prizes for the sports events. Frank Carfer of the Merchandisers and Bill Kirkpatrick of the Contractors carried off the honors in golf. Henry Steinhorst and Clarence Meyers are the Horseshoe champs.

Paul Andrews, chairman and our very able contractor friend and honorary member, Art Heaphy, who acted as Vice Chairman of the Committee on Arrangements, were assisted by a very active committee and all are entitled to congratulations and many thanks for the very fine time enjoyed. The fact that we had such a good attendance, representing all parts of the state, from Buffalo on the west to Newburgh and New York on the east, together with the fact that the Merchandisers—starting with five members in March 1929—has now grown to eighty-six members, is an assurance that the Association has now been successfully launched and is headed for a very active and useful future.

The roll of membership for 1940-1941 is available.  
Charles H. Lighthart, Secretary.

### Toledo

At its forty-first annual meeting held recently, the Toledo Sheet Metal and Roofing Contractors' Association elected the surviving charter members to honorary membership in the association, heard reports by the officers, elected a Board of Trustees, considered a code of ethics presented and written by the secretary, as well as several legislative matters important to the building industry.

The honorary members elected are Ernst Buettner, the association's first secretary; Fred Christen, the first treasurer; and Louis H. Harpst, the association's first vice-president. Mr. Buettner and Mr. Christen are still the active heads of their respective concerns, while infirmities have compelled Mr. Harpst to retire and his sons are carrying on.

The Trustees elected are Clarence Christen, vice-president of The Fred Christen & Sons Company; Wesley Bueche, The Enterprise Roofing Company; L. B. Faunce, The Faunce & Faunce Company; George L. Freeman, The George L. Freeman Company; and H. A. Van Tassel, Toledo Heating and Air Conditioning Company. These Trustees elected H. A. Van Tassel, President; George L. Freeman, vice-president; Clarence Christen, Treasurer; and Henry C. Bitter, secretary.

The Labor Relations, Apprentice Training, Legislative and Entertainment committees will be named by the president at the association meeting on August 14.

Henry C. Bitter, Secretary.

### Philadelphia

The July issue of "The Trade Association News" of the Roofing, Metal and Heating Engineers, Inc., Philadelphia, carries a notice that there will be no meeting of the association in July or August.

Membership in the association has increased during the first half of 1940 and new applications will be presented at the September meeting.

The News carries a short article on overhead expense; plans for September discussions on heating; the value of a bookkeeper; a tabulated report of the overhead expense committee with analysis of statements received from 25 firms covering their operations for 1939; warm air, hot water and steam heating; the association guarantee, the 1940 program; and return postals soliciting furnace cleaning orders.

The September meeting is scheduled for Monday, September 16, at Room 227, Adelphia Hotel, Locust and Juniper Street, at 8 p. m. The trade is invited.

B. F. John, Secretary.

## Association Activities

### New York

The Roofing and Sheet Metal Crafts Institute, Inc., has adopted a standard form of guaranty to be issued by members. They have also adopted another standard guaranty, under which our members not only issue this guaranty, but have an insurance company insure the risk for a period of five years, regardless of whether the contractor is then in business or not.

The association is working on a method for eliminating the doing of sheet metal work by inexperienced mechanics. It has long been our claim that many deaths due to the escape of poisonous gases are caused by defective workmanship. One of our Committees is working on a proposed bill to eliminate such work.

A Committee has been conferring with State Superintendent of Insurance, Louis H. Pink, for the purpose of alleviating the burden placed on the shoulders of small contractors because of the increased Workmen's Compensation rates. We as yet do not know how effective this work will be.

We are arranging for the holding of our annual affair during January of 1941. Tickets will be \$1.00 and we will publish, in conjunction with the affair, a souvenir journal.

I. P. Zinbarg, Executive Secretary.

### Northeastern Ohio Golf Meet

August 16th was the date of the monthly tournament of the Northeastern Ohio Group of the National Warm Air Heating & Air Conditioning Association. Through the splendid efforts of Hunter Morrison of Morrison Products, Inc., the Group was fortunate in securing the use of The Canterbury Golf Club, scene of the recent National Open, for the Tournament.

Excellent weather coupled with the fine condition of the course helped to make the Meet enjoyable and Al. Galaba of Morrison Products turned in the low gross for the day with a 78. Art Rybolt, Rybolt Heater Co., Ashland, had second low gross with a card of 81. "Jim" Wilcox of Canton turned in the high gross of 125. F. E. Snowberg, Minneapolis-Honeywell, won the Blind Bogey and his first leg on the R. A. Jack Trophy.

At dinner, H. S. Sharp, Henry Furnace & Foundry Co., Vice-President of the National Association, acted as toastmaster and introduced George Boedener, newly appointed Managing Director, who spoke at some length on association activities and the plans for making the association an even more potent force for the good of the entire industry. He outlined plans for the program of the 27th Annual Meeting to be held in Detroit in December and pleaded for a more intensive cooperation between all the members, regardless of their business classification, to the end that the best interests of the industry might be served.

R. A. Jack.

### New York Employers

The Employers' Association of Roofers and Sheet Metal Workers of Greater New York (incorporated) reports the following officers of their association:

President, J. L. Fisher, Brooklyn.  
1st V. P., Charles Hartmann, Brooklyn.  
2nd V. P., Joseph Sobel, Bronx.  
Treasurer, Caleb Ringle, Jersey City.

The association is active only in the sphere for which it was organized—making of the working agreement with the existing Union of sheet metal workers.

The apprenticeship system, which has been in successful operation since 1918, is about to experience a decided change.

Herman Weinberger, Secretary.

### Florida

The Roofing and Sheet Metal Contractors Association of Florida reports that on the East coast of Florida, practically all of the sheet metal men are busy and there is considerable duct work for air conditioning and heating being installed. In this part of Florida some of the low cost houses are now being equipped with gas heaters with ducts to the principal rooms. Most of the larger homes in Palm Beach are being equipped for heating by gas or oil burners.

At the present time there is discussion regarding the training of apprentices in the public schools. However, no action has been taken and an apprentice must get his training in a shop and depend on his own initiative to learn the fundamentals of pattern drafting. In this section we are permitted to work one apprentice with each four journeymen. Of course, this restriction applies to union shops and not to the many shops operating where there are no union restrictions.

L. A. Burgess, Secy.-Treas.

### Wisconsin

The Sheet Metal Contractors Association of Wisconsin, Inc., will hold their annual convention on Monday, Tuesday and Wednesday, February 10, 11 and 12, 1941, at the Hotel Pfister.

The district meeting of the Association was held on Saturday afternoon, August 17, at the Hamilton Community Club Room, Two Rivers—called to order in the presence of the Board of Directors and members and visitors totaling thirty.

T. C. Cheney of Milcor Steel Company addressed the meeting on "Advertising Possibilities" for the sheet metal contractor, dwelling on all phases of advertising. He praised FHA for their activities in the construction field and the valuable information available for sheet metal contractors through that organization.

Kramer of Milwaukee experienced that neighborhood papers or circulars brought better results than the larger newspaper advertisements. Gehrke of Shawano illustrated their method of creating business with their "Daily Reminder"; Schomann of Milwaukee had his Daily Reporter advertisement which did not materialize as expected, then turned to writing letters to prospective customers followed by personal introductory calls. Schaer felt that the Droeckamp method (sample shown) had merit, also that collective advertising in newspapers was unavailing unless followed up and written by advertising experts. President Brenner cited their problems and methods of attempting to meet them. FHA literature was distributed.

Director M. L. Van Lannen of the National association submitted his monthly report. The "Code of Ethics" was discussed and turned over to a committee for study, alteration or improvement, after which copies are to be sent to each member for study and discussion before the 1941 convention.

R. G. Suettinger and family and W. Brueckert, manager of the Frank Krescher Company of Manitowoc, were hosts, providing refreshments and a lunch with cigars.

George W. Schmidt, Mishicot, Wisconsin, was accepted as a new member.

Paul L. Biersach, Secretary.

### Fox Valley, Illinois

The regular meeting of the Fox Valley Furnace & Sheet Metal Contractors Association was held Monday evening, August 19th, at Aurora, Illinois. The meeting began at 7:30 and featured a talk and demonstration by Lou Reining of the Automatic Humidifier Co. Mr. Reining talked essentially on the importance of humidifying furnace-heated homes and appealed to the contractors to uphold the prestige of the warm-air heating industry by considering humidification in its proper relation to heat.

Alvin Lohbauer, Secretary.

# New Products

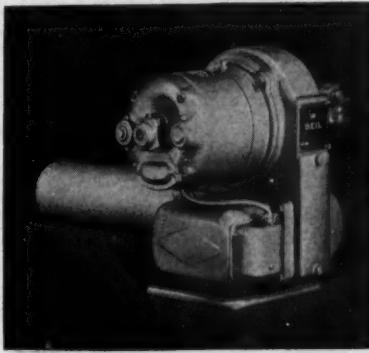
For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 104 and mail to us.

● Indicates product not listed in 1940 Directory.

△ Indicates manufacturer not listed in 1940 Directory.

## 175—Activ-Flame Burner

The Heil Co., 3000 W. Montana St., Milwaukee, announces the Model X-1 Heil Activ-Flame oil burner. Construction features include a  $\frac{1}{2}$  h.p., 1750 rpm, split phase motor, a complete fuel unit consisting of a quiet-operating oil pump, strainer and automatic shut-off valve, and a statically and dynamically balanced Sirocco type fan that provides a constant volume of air for combustion. Accurate

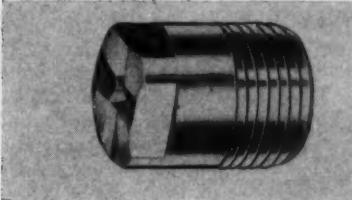


control of air volume and control of the position of the firing head permits adjustment of the burner flame.

Model X-1 operates on either intermittent or constant ignition and atomization of fuel is accomplished through pressure-atomization method—forcing oil under pressure through a nozzle orifice. Ratings for the burner are 1000 square inches warm air or 136,000 Btu's per hour.

## 176—Fulljet Spray Nozzle

Spraying Systems Co., 4021F W. Lake St., Chicago, has just placed on the market "Fulljet" spray nozzle, available in brass. Other materials



can be specified. Pipe connection is  $\frac{1}{2}$  in. male and capacity is 2.5 or 2.9 gpm at 10 lb. pressure.

Nozzle produces a full-cone square spray with uniform distribution. The nozzle can be furnished with round spray pattern. It is a sturdy construction and has large passages.

## 177—Damper Motor

Gleason-Avery, Inc., Auburn, N. Y., has announced the Safe-Return damper motor, featuring positive straight-line control. A rack slides



back and forth through the case—eliminates sprockets and rotating arms. If current fails, spring return closes drafts instantly.

The unit is powered to lift more than 20-pound pull of spring. Parts are cadmium plated. Control circuit is two-wire low voltage. Terminals are outside of the case. Motor coils and leads are enamel glass insulated.

## 178—A. C. Oilfurnace

Timken Silent Automatic Div., The Timken-Detroit Axle Company, 100 Clark Ave., Detroit, announces a new Timken air conditioning oilfurnace in two sizes. Model FFR-140 and



Model FFR-170 with Btu outputs of 140,000 and 170,000, respectively.

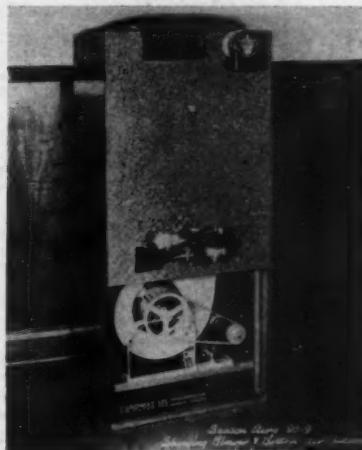
Units are built around the Timken Model H wall-flame oil burner.

Models FFR offer complete winter air conditioning—filters, humidifies, heats and circulates the air automati-

cally. The cabinet is finished in two-tone green Hammerloid finish.

## 179—Model 90-9 Season-Aire

Season-Aire Corporation, 20 Bartlett St., Detroit, is presenting Season-Aire Model 90-9, a compact unit requiring only 4 sq. ft. of floor space. Oil or gas-fired units are available. The oil-fired rating is 75,000 Btu at



the bonnet with 750 c.f.m. blower capacity.

Featured in the construction are Minneapolis-Honeywell controls, float-type humidifier, throwaway type filters, multi-blade blower, Season-Aire "thrift" principle of burner operation and heat transfer.

## 180—Synthetic Rubber

American Bar Lock Co., Inc., Ablo Products Division, Long Island City, N. Y., is introducing Ablo synthetic



rubber compound to be applied cold with gun or trowel.

Ablo is supplied in cartridges for use with a special convertible cartridge gun, or in 1 or 5-gallon cans and 55-gallon drums.

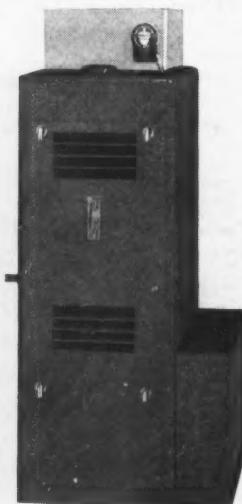
# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 104.

## △181—Custom-Aire Conditioners

Heating Equipment Co., San Francisco, announces two new Custom-Aire winter air conditioning units.

The RB series is designed for use where headroom is scant. In this model the blower and filter is placed to the right of the heating unit.



In the UB series, the blower is located beneath the heating unit, while the filter compartment can be installed either on the right or left side or in the floor beneath the furnace.

Up-draft heating elements constructed of heavy steel are a feature of the Custom-Aire blower series. Each section of the element is fusion-welded to make a jointless, gas-tight unit. No baffles or traps are used.

Each heating section has a multiburner consisting of many individual bunsen-type burners. In addition, there is a connecting burner of the same type.

Five sizes in both UB and RB series are available. The Btu input per hour in each series ranges from 70,000 to 200,000 as rated by the AGA.

## 182—Fan Line Extended

Hartzell Propeller Fan Company, Piqua, Ohio, has extended their line of Charavay industrial fans and new features have been installed. Performance of the Tear-Drop, Standard and Birdwing propellers have been studied under varying conditions, sizes and designs which overlap in performance characteristics have been eliminated, and new sizes and designs have been introduced where needed.

Hartzell Charavay fans are now available in single propeller, two-propeller and multiblade types. New mounting styles include an improved extension shaft, a new belt-drive blower, belt-drive exhaust fan and a slow tip speed fan.

## ●183—Power Flanger Attachment

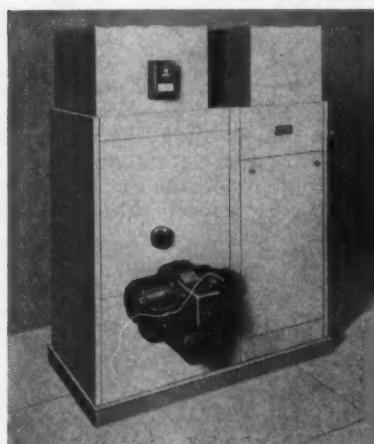
The Lockformer Company, 4615 Arthington St., Chicago, announces a power flanger for attachment to the Lockformer 22 in addition to the power flanger attachment for the Lockformer 24.

Both Power Flanger attachments may be installed either at the factory prior to machine shipment, or at any later date in the user's shop. Both turn a  $\frac{1}{4}$  in. right angle flange on either straight or curved pieces to a radius as small as  $1\frac{1}{4}$  in., and are fitted with an adjustable guide.

## 184—FHA-O Conditioner

Fluid Heat Division, Anchor Post Fence Company, Eastern Avenue and Kane Streets, Baltimore, has designed a new oil-burning air-conditioning furnace for small homes, with a maximum capacity of 80,000 Btu at the bonnet.

Construction is in two compartments—one for blower and filters, and the second for the heat exchanger. Air enters the duct connections at the top to the right and is filtered, circulated by a blower over the primary



and secondary heating surfaces, and then enters the warm air plenum chamber at the left. A humidifier in which the water level is constant and automatically controlled is located in the warm air supply plenum chamber. Blower capacity is 1000 cfm.

The company's model P-3C oil burner is flange mounted to the front of the unit and fired into a 9x12 in. pre-formed combustion chamber.

This conditioner is also supplied in an all enclosing jacket. In this model the oil burner is moved to the left end of the unit and the jacket extended to cover the burner.

The series FHA air conditioning furnaces are also supplied in capacities of 125,000; 170,000; and 215,000 Btu at the bonnet.



## 185—Reznor Gas Furnace

Reznor Manufacturing Company, Mercer, Pa., has developed the Reznor gas furnace No. KO60, aimed primarily at the minimum cost home, with an output of 45,000 Btu per hour. There are no filters.

Control equipment includes wall thermostat, thermocouple energized electric gas valve, thermocouple energized automatic safety shutoff that cuts off the gas supply in case of pilot failure, low cost fan control, height limit control, automatic gas pressure regulator, and pan type humidifier with automatic water lever control.

Combustion chamber and flue chamber are made of Plymetal (Chrome molybdenum copper bearing steel sheathed on each side with a rust resisting zinc alloy) arc welded together. Separate casing lining plus adequate baffling reduces heat loss. The KO60 casing is made of 20-ga. auto body steel, reinforced with slip-joint corners. Casing is finished in Reznor's seal brown, micro grained baked wrinkle enamel.

## 186—Hammertone

Maas & Waldstein Company, 438 Riverside Ave., Newark, N. J., has developed a new type of finish, known as "Hammertone," for finishes resembling hammered silver, copper, bronze and other ornamental metals, and also bakelite molded plastics.

A base coat of the desired color is first sprayed on. This is followed immediately by a spatter coat of Hammertone liquid, which produces the hammered pattern in the base coat. The product is then baked at medium heat for an hour, which produces a lustrous metallic finish. A special form of spray gun is used for the spatter coat.

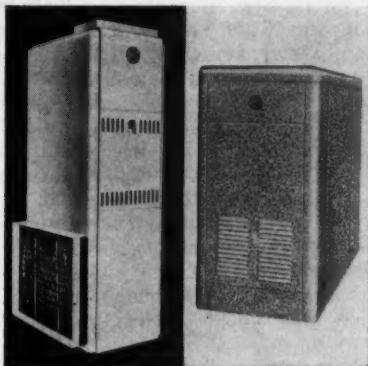
# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 104.

## 187—Two Yorkaire Units

York Ice Machinery Corporation, York, Pa., announces the Yorkaire heat standard oil-fired air conditioning furnace, and the Yorkaire heat vertical gas-fired a. c. furnace.

The oil-fired unit combines automatic oil heat with winter air conditioning oil burner, heating element, air filters, circulating fan, and humidifying apparatus, automatically controlled by a thermostat.



The gas-fired unit can be installed in a closet, utility room, or basement. Advantages are the extremely small floor space; finned cast iron heating element; efficient air filters; humidifier; circulating fan, which can also be used for summer ventilation. Only four connections are necessary. Available in three sizes.

## 188—CO<sub>2</sub> Analyzer

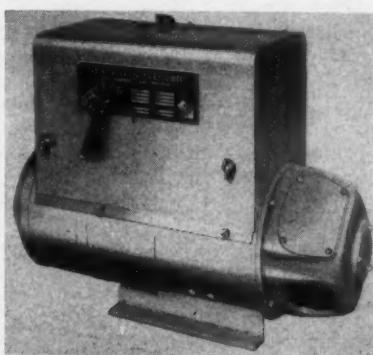
Bacharach Industrial Instrument Company, 7000 Bennett St., Pittsburgh, announces a chemical type CO<sub>2</sub>



analyzer, trade-named Fyrite. A new feature is the gas sampling equipment which includes a primary flue filter with a replaceable filtering thimble.

## 189—G-E Arc Welder

The General Electric Company, 1 River Road, Schenectady, N. Y., announces a new 200-ampere, d-c arc welder to provide any welding current from 25 to 250 amperes. This wide

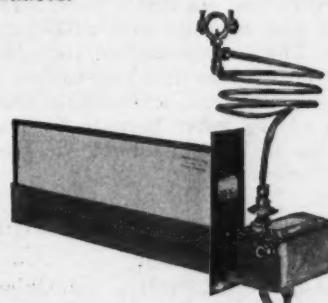


range allows all-day manual welding to be done with currents up to 200 amperes, using electrodes from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch in diameter. Capacity is also provided for the use of electrodes as large as  $\frac{1}{4}$  inch on short jobs.

Self-sealed ball bearings are used. An improved ventilating system prevents overheating when the welder is operated within the range hour after hour.

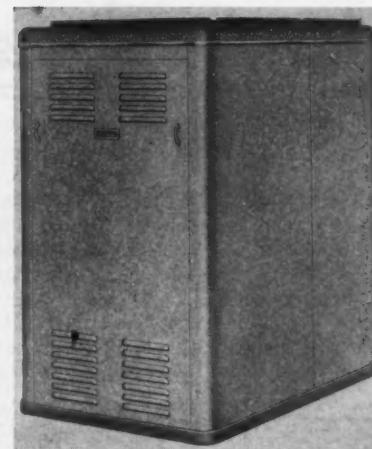
## 190—Convector Humidifiers

Maid-O'-Mist Inc., 215 N. Aberdeen St., Chicago, announces new and smaller sizes of "Convector" humidifiers for forced air, gravity and floor furnaces.



The "Convector" humidifier offers continuous quick evaporation at low temperatures and is now furnished in 18 sizes from 15 in. troughs up to 34 in. in single, double and 4 trough units—automatic float feed, or drip feed. Troughs of copper are  $\frac{1}{4}$  in. wide and on the double or 4-trough units are spaced 1 in. apart.

Patented metal-edged replaceable evaporators six inches high are of special absorbent material, inserted in troughs. Water feeder is of brass, copper and monel metal with all parts including copper float nickel plated. Smallest size is made to fit 16 in. plenum chambers.



## 191—Luxaire Gas Conditioner

The C. A. Olsen Manufacturing Company, Elyria, Ohio, is offering a gas-fired air conditioning unit in three sizes—110,000, 165,000 and 220,000 Btu input per hour.

The heating element is steel, welded, and consists of round combustion chambers, round radiators, plus an economizer.

A feature is the Luxaire "Multi-Port" burner—chrome steel grids replace the conventional ports.

The cabinet is rigid and the finish is two-toned green hammerloid enamel, embellished with a chromium-plated moulding strip.

Standard equipment includes all necessary controls and an evaporative type of humidifier.

## 192—90 and 120 MB

Richardson and Boynton Company, 274 Madison Avenue, New York City, announces Models 90-MB and 120-MB gas-fired winter air conditioners, with Btu output of 72,000 and 96,000.



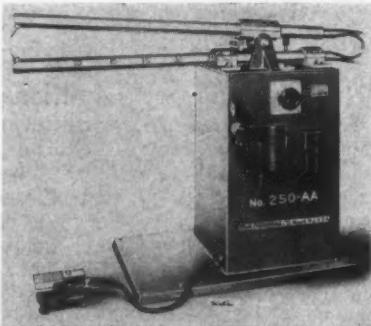
Cabinets are of furniture steel with baked enamel Hammerloid finish. Controls are furnished as regular equipment with both units. Humidifier is float type. Blower is positive centrifugal type with 12 inch wheel.

# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 104.

## 193—Long-Horn Spot Welder

The Eisler Engineering Co. of 740-770 S. 13th St., Newark, N. J., has placed on the market a long-horn spot welder—No. 250-AA—for deep sheet metal work. The new feature on this machine is that both upper and lower horns can be lengthened or shortened



to meet the requirements of the size and type of work. The new horn adjustment makes it possible to weld light and heavy work and deep metal parts.

The spot welders are made with many different styles of electrodes, and in three sizes: 5 to 25 KVA, 20-50 KVA, 40-75 KVA.

## 194—Water Pan Filler

Viking Air Conditioning Corp., 9500 Richmond Avenue, S. E., Cleveland, announces a new automatic furnace



water pan filler in a two-color display carton. The No. 11 Flat Valve Control Kit consists of the Viking flat valve assembly, saddle valve for connection to the water line, and copper tubing with all necessary fittings.

## 195—Humidifier Valves

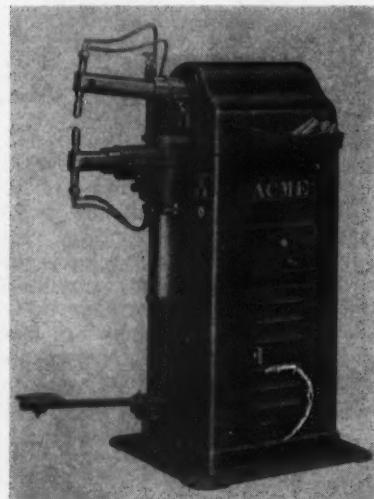
The Morency-Van Buren Division of the Scoville Manufacturing Company, Sturgis, Michigan, has recently announced two humidifier valves with the valve mechanisms entirely outside the furnace or air-conditioning unit. The mounting of the valves outside,

coupled with the use of the new M-VB Pyrex Glass Float, provides for the corrosion problems.

Both the No. 300 and the No. 305 valves have large passageways that cut water-rush and splashing.

## 196—Hot Spot Welders

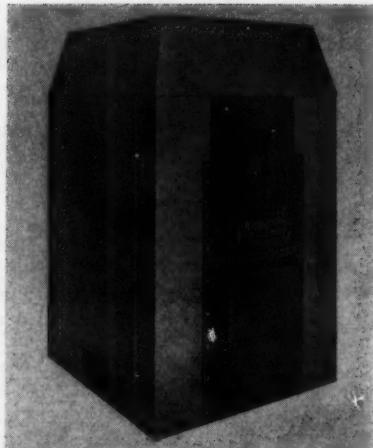
Acme Electric Welder Company, Huntington Park, Cal., announces foot operated rocker arm Type 2 in 20- and 30-KVA transformer capacities, and Type 3 in 40- and 50-KVA transformer capacities, as companion lines to the recently announced Types 0 and 1, foot-operated "Hot Spot" welders.



The housings of these spot welders are all-welded fabricated steel. Horns are double and reversible, one end machined to hold electrodes at 90-degree angle and opposite end 22½-degree angle. The arrangement of the swivel lower horn holder on a long column allows for horizontal and vertical movement of the lower horn to facilitate welding in hard-to-get-at places and deep pans or boxes.

## 197—Monogram Vaporizing Burner

The Quincy Stove Mfg. Co., Quincy, Illinois, is using the new Monogram patented Turbulent Flame Vaporizing burner in all of its oil heating appliances. The Monogram Vaporizing burner vaporizes the oil so that no soot or carbon is formed. As the vapors or gases rise, they are mixed with primary air between the two shells of the burner. Small streams of secondary air are thoroughly mixed with these gases at the point of combustion by means of the teeth of the Turbulator ring which are scientifically placed so that the proper amount of air is admitted. The Rotor Plate produces a short, wider flame creating a lower heat zone and permits the use of a double baffle in the heating unit.



## 198—Stoker-Fired Gravity

The Henry Furnace & Foundry Company, 3743 East 49th St., Cleveland, Ohio, announces a new steel gravity furnace designed for stoker firing.

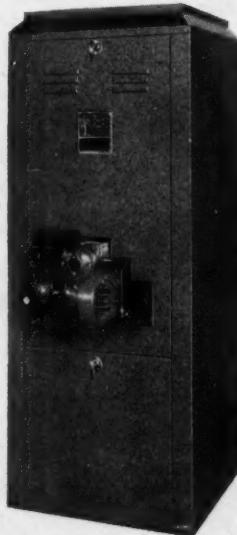
The essential features of the DST model are a tunnel which permits the burner pot of the stoker to be inserted at either side of the furnace, as well as at the front; and a pan located in the front for holding hot clinkers. This pan vents into the smoke outlet.

The heating unit is of heavy O. H. steel, with no bolt holes through the drum or radiator.

The square casing is finished in smooth green baked enamel, with cast iron front in black.

## 199—Tropic Breeze Hi-Boy

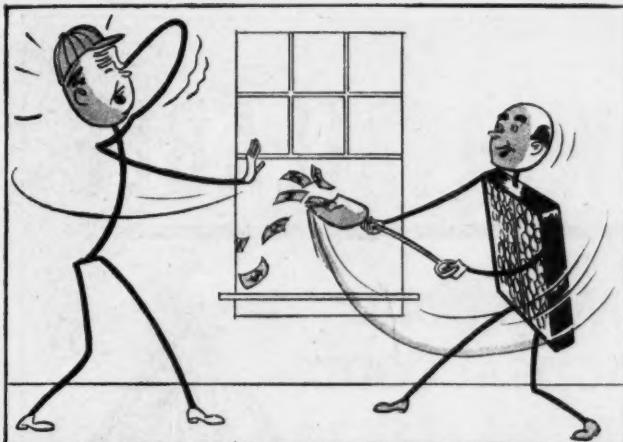
Dalzen Manufacturing Company, Dept. 100, 511 Leib St., Detroit, announces the Tropic Breeze Hi-Boy model winter air conditioner, equipped



with a hi-pressure gun-type burner, and handling as low as 7/10ths gallons per hour. The unit requires only 26 x 27 inches of floor space.

The heat exchanger is made of 14 and 16-gauge steel, and the unit is equipped with an oversize (12 in.) blower.

These Tropic Breeze winter air conditioners are available in either oil or gas-fired models.



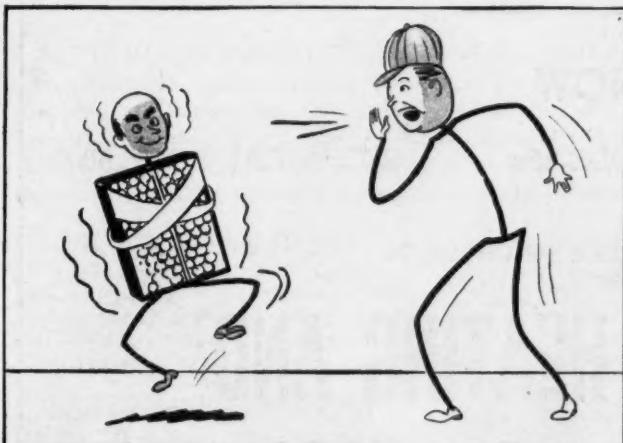
**DUST-STOP MAN:** Bill, you're just shovelling dollars out the window on your forced warm-air furnace jobs.

**BILL:** Is that so? How come?



**DUST-STOP MAN:** Because you're not even starting to sell the number of Dust-Stop\* Filter replacements you ought to.

**BILL:** But my customers don't know they're supposed to change their filters. Some of 'em don't even know they have filters at all.



**DUST-STOP MAN:** Bill, you can make 'em crazy to buy Dust-Stops by doing a couple of simple things.

**BILL:** What do you mean?



**DUST-STOP MAN:** Just this. The manufacturers of Dust-Stop Filters are offering you the *biggest and finest set of dealer helps ever offered in the air filter industry.*

**BILL:** Gosh! Sounds great! What do I do?



**DUST-STOP MAN:** Just ask your Dust-Stop jobber for FREE postcards . . . FREE mailing pieces . . . FREE newspaper mats . . . FREE filter-change labels . . . And get a FREE sales portfolio that tells you how and when to use these sales tools.



**BILL:** Holy smoke! With all that stuff I can make a gold mine out of Dust-Stops. I not only get a nice profit on the Dust-Stops themselves, but I got a chance to sell the same customers lots of other things, too. Thanks for a profitable tip, little fella.

## FIBERGLAS\* DUSTOP\* AIR FILTERS

\*T. M. REG. U. S. PAT. OFF.

Made by Owens-Corning Fiberglas Corporation, Toledo, Ohio

DIRECT CANADIAN INQUIRIES TO FIBERGLAS CANADA, LIMITED, OSHAWA, ONTARIO

# **NEW CODES NOW AVAILABLE**



**11TH EDITION—GRAVITY CODE**

**5TH EDITION—PRACTICAL CODE  
AND**

**3RD EDITION—TECHNICAL CODE**



**FOR THE ENTIRE HEATING INDUSTRY**

**ORDER NOW**

**GRAVITY CODE 25c**

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**SEND STAMPS, MONEY ORDER OR CHECK TO**

## **NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION**

**5 E. LONG ST.**

**—**

**COLUMBUS, OHIO**

**NO HEATING CONTRACTOR CAN AFFORD TO OVERLOOK  
THE PRESTIGE GAINED BY THE USE OF THE CODES**

**ARCHITECTS, ENGINEERS AND BUILDING CONTRACTORS RECOGNIZE  
THE ADVANTAGES OFFERED BY INSTALLATIONS MADE ACCORDING  
TO CODE**

**EVERYONE IS INVITED**

### **27th ANNUAL CONVENTION TO BE HELD IN DETROIT, HOTEL STATLER, DEC. 10th & 11th**

# Pacific

## BEAT COMPETITION WITH THIS LOW COST FORCED-AIR FURNACE

**Capacity for All Heating and Ventilating Requirements**

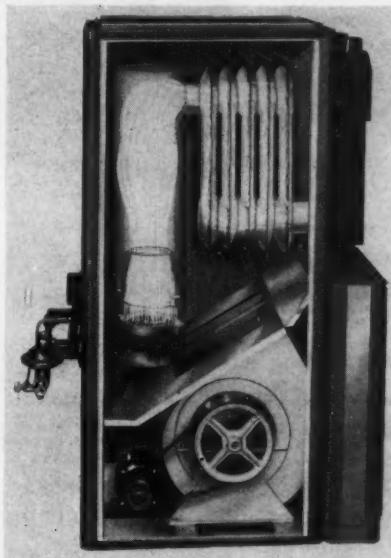
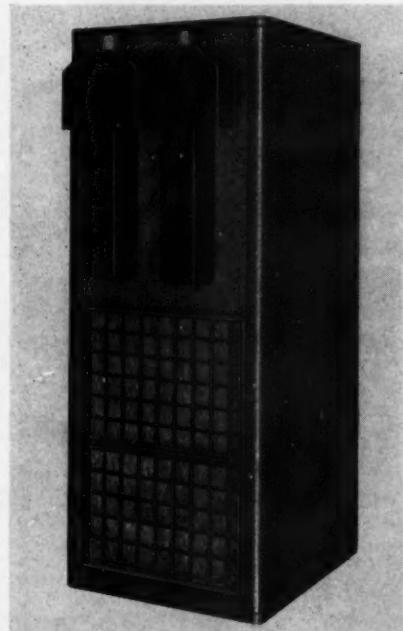
ADAPTABLE to successful solution of the most difficult combination heating and air-conditioning problems in all types of buildings, this compact, efficient, low cost "Pacific"-Manufactured Gas-Fired Furnace is available in a complete range of sizes from 50,000 to 550,000 B.T.U. input. Unsurpassed performance has won acceptance everywhere for Model 8SFB, with sales rapidly increasing.

### NEW TYPE HEATING ELEMENT

AN innovation in gas furnace design and construction is the round combustion chamber and radiator of heavy *rust-resisting steel* welded into a one-piece gas-tight leak-proof unit.

### HIGHER EFFICIENCY, LONGER LIFE

SO RAPID is heat transference that through this element the maximum heating power is reached a moment after the gas is turned on. This is accounted for by increased effective ra-

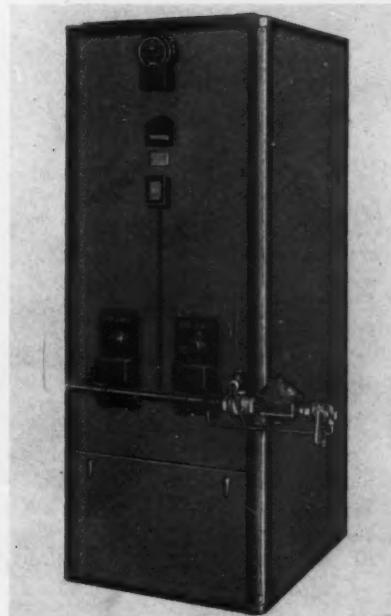


diation area, increased air flow, longer combustion travel, and the all-steel construction. These factors, together with the "Pacific" venturi-type round burner, combine to extract the maximum heat units from the fuel consumed and transmit them to the inner warm air passages in the shortest possible time. Heat emission is constant throughout the performance range.

To prolong the life of the all-steel element, a heavy cast-iron fire-box liner just above the burner protects the side walls of the combustion chamber from contact with the flame.

### QUIET, POSITIVE AIR DELIVERY

THE BLOWER is a powerful im-



**LEFT:** Venturi-type round burner with primary air adjustment. Raised flame tips permit scientifically perfect secondary air and gas mixture.  
*Above burner is heavy cast-iron fire-box liner.*

proved multi-blade type, equipped with Fafnir "Life-Time" lubricated steel ball bearings (no oiling required) and mounted in rubber pillow blocks for quiet operation. Variable speed adjustment permits change in air volume for winter and summer.

### CORRECT SIZE FOR EVERY NEED

AS the Heating Element is of the sectional type, any number of elements may be assembled in the one casing to provide a furnace size for any requirement. When assembled in multiples, an interconnecting passageway permits flame travel from the pilot to each burner successively.

WRITE today for complete details... step up sales and profits with this and other popular "Pacific"-Manufactured Gas-Fired Furnaces—a complete line!

**PACIFIC GAS**  
MAIN OFFICE AND FACTORY

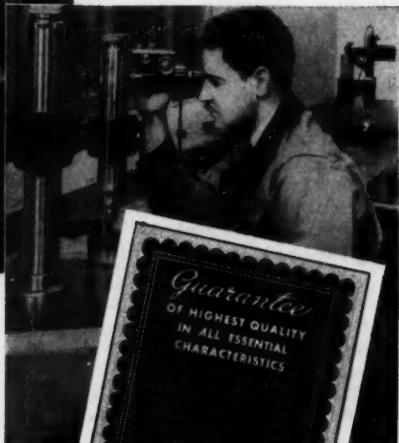
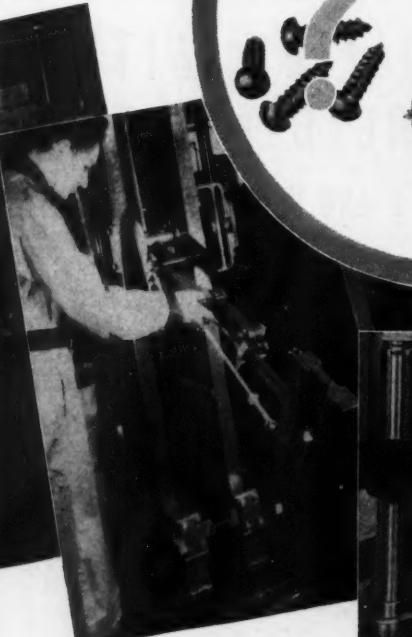
27 Successful Years



**RADIATOR CO.**  
HUNTINGTON PARK, CALIF.  
*...and Still Growing!*

# UNEQUALLED CHECK-UPS

eliminate the "Doubtful Few"



Some of the scientific check-ups in the 16-Point Quality-Control routine.

## . . . when Parker-Kalon's Quality-Control Laboratory backs your fastening devices

You get an unequalled protection against time-wasting, cost-boosting "duds" among your fastening devices when you specify Parker-Kalon! For, in Parker-Kalon's plant, an unusual Quality-Control Laboratory stands guard over all production, to eliminate the "doubtful few" screws that slow-up assembly work and produce unsatisfactory fastenings.

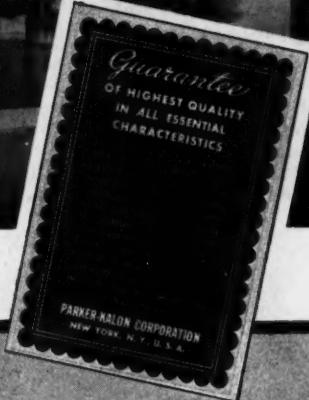
Without counterpart in the industry, this scientific Laboratory sets standards of quality that could never be maintained without rigid quality-

control of every production step from chemical analysis of the metal to micrometric check-up of finished dimensions. It insures that every Parker-Kalon Fastening Device is more than "good enough" in both accuracy and strength.

Take no chances in your assembly jobs . . . buy Hardened Self-tapping Screws, Socket Screws or other fastening devices that are made in the screw industry's most modern plant. Parker-Kalon Corporation, 190-192 Varick Street, New York.

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

Quality-  
Controlled **PARKER-KALON**  
Fastening Devices



COSTS NO MORE to get  
this Parker-Kalon Quality-Control  
Guarantee with every box of . . .



### Hardened Self-tapping Sheet Metal Screws

Sizes and head styles for assembling light and heavy sheet metal

### Hardened Screws

For fastening sheet metal to wood securely

### Hardened Masonry Nails

For fastening to brick, mortar, concrete, etc.  
easier and quicker

## Association Activities . . .

### South Bend, Indiana

Joseph W. Lauber reports the Master Sheet Metal and Warm Air Heating Association as rather inactive. Mr. Lauber reports a surplus of mechanics. An apprentice school sponsored by the State was started last winter, but students were either too slow to grasp or the teacher was in too much of a hurry.

Many houses, he says, selling for \$3,975, are being built by speculative builders. Round pipe gravity jobs with furnace in the basement is the type of heating system used. Most installations are conventional.

### Memphis

W. L. Eichberg, formerly secretary of The Associated Sheet Metal Contractors, reports that they have no association at the present time. Business is good, he says.

Memphis has a school started by the government and city Board of Education which is training young boys for the sheet metal trade. They have an up-to-date shop, and in a few years expect to have some first class sheet metal workers.

The scale of wages is \$1.25 per hour for sheet metal workers.

### Oregon

The Oregon State Air Conditioning Conference is held as one of the activities of the Oregon Chapter of the American Society of Heating and Ventilating Engineers. Officers are:

President—Thos. E. Taylor, Postal Building, Portland.  
Vice-President—James F. McIndoe, American Radiator Company, Pacific Building, Portland.

Treasurer—Cecil M. MacGregor, Portland Gas & Coke Co., Portland.

Secretary—Bryant W. Moore, 105 S. W. Third Ave., Portland.

Each year a committee is appointed by the president and Board of Governors of the Society to handle the Air Conditioning Conference. As yet, only preliminary plans have been made for the 1941 Conference. There is considerable discussion in the chapter in favor of having the Conference held at Portland instead of the college. This would make it possible to have an attendance of approximately 1,000 persons at the Conference and will make a much larger space available for display of manufacturers' equipment.

We have experienced a considerable increase in residential building activities during the first seven months of 1940, the bulk of the houses ranging from \$3,800 to \$6,500. Very few of the \$2,500 class houses have been constructed. In these homes, 95 percent of all homes constructed are heated by warm air heating plants. Approximately 40 percent of the homes constructed are heated by automatic fuel—either gas or oil, there being about five oil installations to three gas installations. Eighty-five percent of the automatic-fired heating plants are of the forced-air winter air conditioning type, the remaining 15 percent being of gravity type.

There are a sufficient number of mechanics available in this territory; however, the average age of carpenters is said to be approximately 65 years, with plumbers, steam fitters, electricians, and specialty men approaching the same average age. The Central Labor Council in Portland has established an apprentice school for the training of young men and much consideration is being given to the fact that young men have not taken up the building trades during the past ten years. Among this apprentice activity is a course which is highly liked by the sheet metal contractors for the development of sheet metal apprentices.

Cecil M. MacGregor,  
Treasurer.

## "FIRST-CLASS FASTENINGS EVERY TIME"

...no 'doubtful screws'  
to run up costs!"



That's why 40,000 sheet metal contractors  
do better work, increase profits  
with Parker-Kalon Screws

Want to turn out good jobs . . . do them faster . . . and make more profit? Take a tip from this sheet metal contractor . . . insist on genuine Parker-Kalon Sheet Metal Screws. Then you'll be certain to avoid "doubtful" screws . . . the troublesome kind that slow up jobs and run up costs by breaking, stripping or failing to draw up tight.

Yes—order Parker-Kalon Screws and you'll get perfect results. For these superior Screws are made to highest standards by the originators of the Self-tapping Screw . . . and Quality-Controlled from start to finish by the famous Parker-Kalon Laboratory. Mail coupon today for free samples to: Parker-Kalon Corporation, 190-192 Varick Street, New York, N. Y.

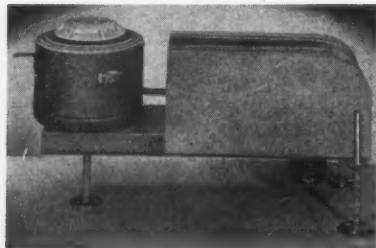


## New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 104.

### △ 200—Automatic Power Oilburner

The Miller Company, Meriden, Conn., announces the Miller automatic vaporizing oil burner designed especially for the heating of the small home 50,000 to 80,000 Btu using No. 2 or No. 3 oil.



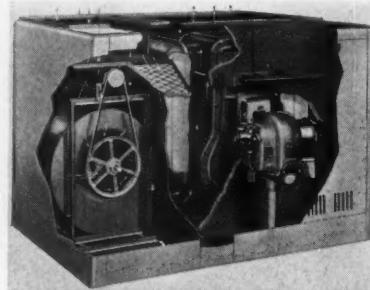
The burner is approved by Underwriters' Laboratories to burn No. 3 oil. The high-fire rating is only 9/10 of a gallon of oil per hour. A feature is the constant level valve which, after going into action, resets itself automatically.

Accessories include constant level valve, thermo-valve top which controls the constant level valve, room thermostat, transformer, draft regulator. A pilot flame makes unnecessary oil igniting electrodes, gas pilots, etc.

### 201—Redesigned Rudy

The Rudy Furnace Company, Dowagiac, Michigan, has redesigned its line of cast iron oil heat winter air conditioning units to provide increased efficiency and enhance eye appeal. Three sizes are available.

New features include: a black radiator which adds heating surface, lengthens fire travel and reduces stack temperatures; new metal liners around heating compartment with  $\frac{1}{4}$ -in. air space between liners and casing to reduce heat loss and prevent hot outer surfaces; new Rudy oil burner with



built-in depulsator and new firing head; smoothly finished Mulberry enameled casing completely enclosing the units.

### 202—Model 80-P Conditioner

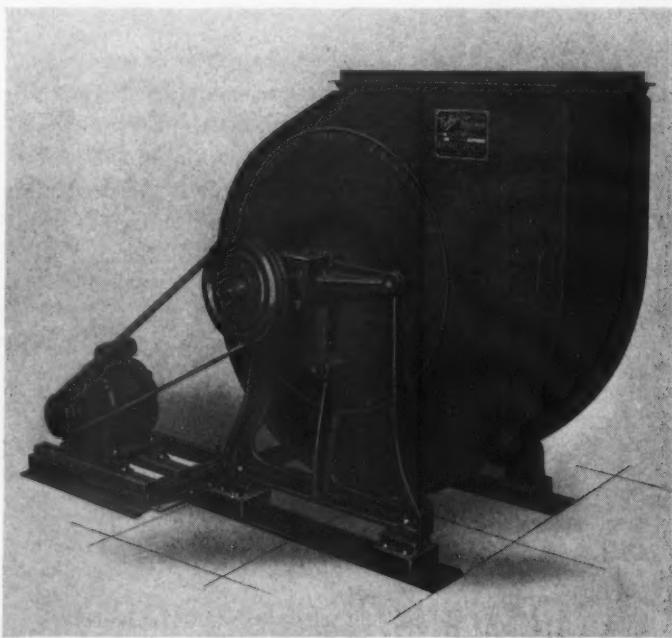


Bard Manufacturing Company, Bryan, Ohio, announces Model 80-P, a winter air conditioning unit with an output of 80,000 Btu at the bonnet.

Features are its compact size (28x 28 in. base with an overall height of 62 in.), new float operated humidifier, removable air filters, air cell insulated cabinets, finished in two-tone grey baked enamel.

The Model 80-P is equipped with a pressure type burner.

## This FAN RIDES ON A CUSHION!



### No Wonder It's "TOPS" in Quiet Ventilation

Handling large volumes of air—quietly—is no problem to engineers who are familiar with Buffalo's Limit-Load Fan with the Silent Floating Base. Not only are these fans designed and built with perfect balance—but as an added noise-preventing feature—the entire structure can be mounted to ride on a silencing cushion. The decibel rating tests will quickly convince you that here is the *real* fan for quiet, efficient ventilation!

Better get all the facts today. Write for Bulletin 3099.

#### BUFFALO FORGE COMPANY

497 Broadway Buffalo, N. Y.

Branch Engineering Offices in Principal Cities  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

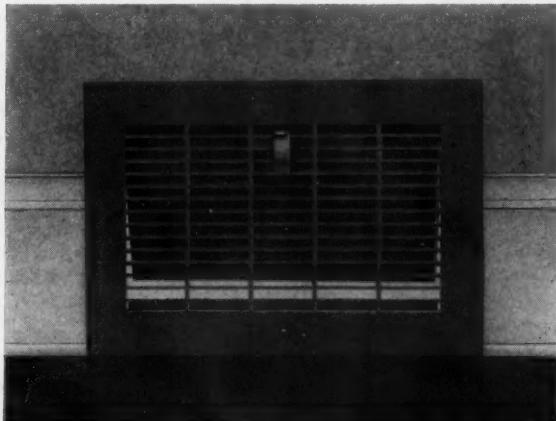
**"Buffalo"** **Limit-Load**  
REG. U. S.  
PAT. OFF.

**FAN** with **Silent**  
**Floating Base**

# REGISTERS · GRILLES and INDUSTRIAL SCREENS

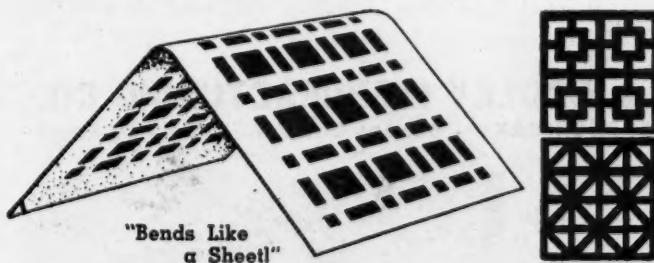
## NEW BEAUTY and EFFICIENCY

The appearance and performance of your air conditioning, heating and ventilating jobs is of prime importance to you. An inefficient and unattractive installation will work to your disadvantage in both repeat orders and customer's recommendations. Make sure that all your jobs will be a credit to your workmanship and reputation by specifying and installing STANDARD registers. We can supply you with registers, grilles and industrial screens in any quantity and we'll send you a catalog on receipt of your request. Write today.



The new low cost register and grilles are of modern stamped design and perform ideally on warm air heating and air conditioning installations. They are made in all standard sizes with large open area and with a sponge rubber attachment to prevent dust streaks.

### PERFORATED METAL

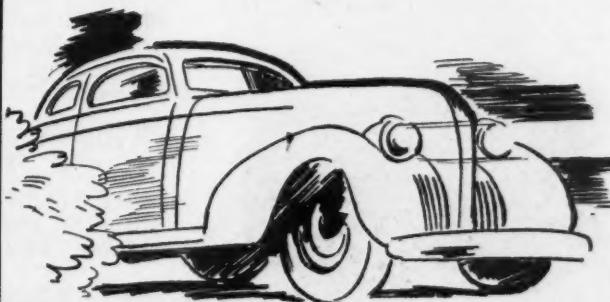


The STANDARD line of industrial screens and fancy panels is unusually varied and the fine assortment of faces and perforations affords a screen or panel for every application.

**WRITE TODAY FOR CATALOG**

**STANDARD STAMPING & PERFORATING CO.**  
3137 W. 49th PL. Chicago, Ill.

*Would you like a car  
with only two speeds -*



## 60 or Zero?

It would hurtle you down the street—or leave you stranded in the middle of the car tracks. Not very desirable is it? Yet, to a certain extent we have a similar situation when we install a blower with a single-speed bonnet switch on a warm air furnace.

Although superior to gravity operation, because it provides an even circulation of clean, warm air throughout the house, intermittent blower control often fails during off-periods to prevent stratification and stuffiness.

Just as the accelerator was developed so that you can regulate the speed of your automobile to meet varying road and traffic conditions, so have we perfected a blower control that is sensitive to minute changes in the bonnet temperature of a furnace.

This is the improved PATROL MODULATOR which can be obtained with any of the 21 sizes and styles of REX AIR-PAK Blower-filter units.

### PATROL MODULATOR

The PATROL MODULATOR consists of the sensitive diaphragm control shown at the right which operates a damper in the blower outlet. This in turn regulates the amount of air delivered (and power consumed) in direct proportion to bonnet temperatures. The cost? Considerably less than that of a conventional two-speed control and motor.



*Write for full details to:*



1937 W. 114th St.

Cleveland, Ohio

# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 104.

## 203—Ventil-aire

Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, is introducing the new Ventil-aire.



The Ventil-aire takes in fresh outside air and filters, circulates, and expels smoke, odors and stale air. During the winter season, deflectors may be set to direct incoming cool air toward the ceiling. Outside air may be either taken into the room or eliminated entirely.

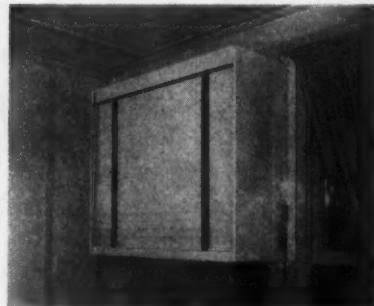
## 204—Coke Stoker

The Bryant Heater Company, 17825 St. Clair Avenue, Cleveland, has been selected to manufacture the bin-feed coke stoker recently per-

fected by the Koppers Company of Pittsburgh, and to conduct the merchandising campaign for the stoker, which will bear the Bryant name, according to Fred Denig, vice president in charge of research for Koppers Company.

## 205—Window Ventilating Unit

Reed Unit-Fans, Inc., 811 St. Charles St., New Orleans, has developed the Wind-O-Vent to take care of



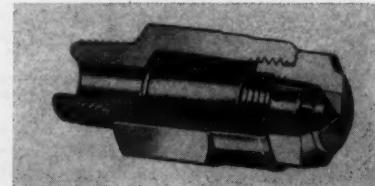
situations where attic ventilation can not be applied. The Wind-O-Vent is hung by driving a nail or screw in the

frame above the window, by means of a hole in the upper flange, hanging the Wind-O-Vent like a picture on the wall. Each Wind-O-Vent is provided with an attachment cord to plug into the nearest outlet. An on-and-off switch is provided and just above it a reversing switch. Venetian blind has an actuating rod that fixes the blinds to deflect the air up, straight out, or down when the fan is reversed to blow air in. Spring tension holds the blinds shut when the fan is not in use. The upper sash is lowered when fan is running.

Light ivory is standard finish. The fan is 30 in. in diameter and powered by a  $\frac{1}{4}$  hp. motor. Felt pads cushion the fan case from window frame.

## 206—Hydraulic Atomizing Nozzles

Spraying Systems Co., 4021F W. Lake St., Chicago, has just placed on the market a new hydraulic atomizing nozzle. Spray pattern is hollow cone



with uniform distribution and atomization with relatively low hydraulic pressure, for water, oil and other liquids with similar viscosities.

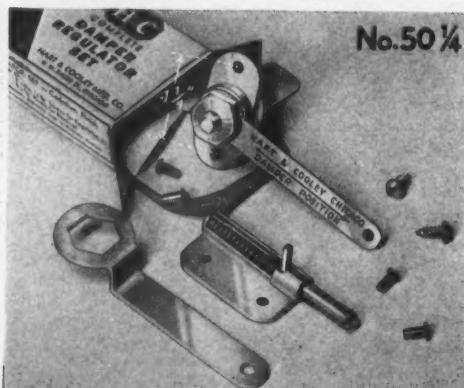


## DAMPER REGULATOR SETS



(No. 40 $\frac{1}{4}$  S Set with snap bearing is now furnished for No. 40 $\frac{1}{4}$  Set at 30c List Price)

**ECONOMY TYPE—Quality at a Price!**  
Furnished with both wing and hexagonal lock nuts.  
Made only with  $\frac{1}{4}$ " Bearings. No. 40 $\frac{1}{4}$  S—List Price 30c Set.



No. 50 $\frac{1}{4}$

## Pick the Type that Suits you Best!

H&C offers three different sets in the  $\frac{1}{4}$ " size, all furnished with snap end bearing to permit the installation of even the smallest dampers without bending. All are quality sets in every detail with all parts rust-proofed; all are equally adaptable to splitter or regular dampers. See your Jobber or write for sample and descriptive literature.

**HART & COOLEY MANUFACTURING CO.**  
**HOLLAND, MICHIGAN — Chicago Office at 61 W. Kinzie Street**

### BRACKET TYPE (left)

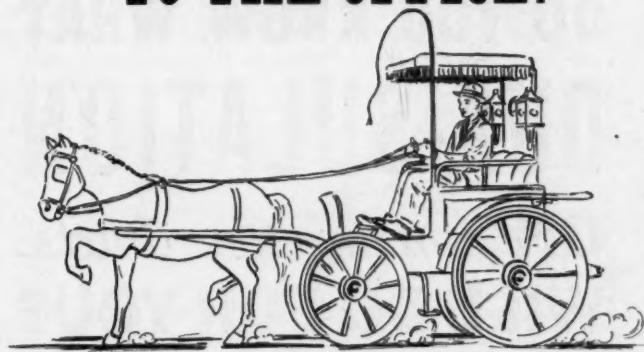
With  $\frac{1}{4}$ " Bearings. No. 50 $\frac{1}{4}$ —List Price 40c Set. With  $\frac{3}{8}$ " Bearings. No. 50 $\frac{3}{8}$ —List Price 60c Set.  $\frac{1}{4}$ " size has snap end bearing.

### DISK TYPE (right)

With  $\frac{1}{4}$ " Bearings. No. 80 $\frac{1}{4}$ —List Price 40c Set. With  $\frac{3}{8}$ " Bearings. No. 80 $\frac{3}{8}$ —List Price 60c Set.  $\frac{1}{4}$ " size has snap end bearing.



## STILL DRIVING A HORSE AND BUGGY TO THE OFFICE?



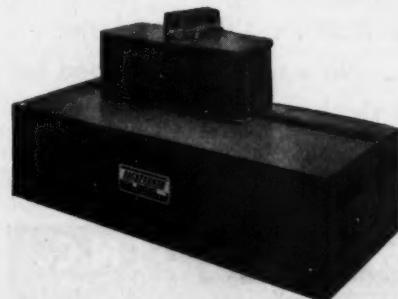
**O**f course Old Dobbin always "got you there and brought you back"—and hand methods, no matter how slow or obsolete, will still "get the job done."

But today's competition demands more than merely getting the job done. It demands a greater margin of profit to offset today's greater cost of doing business. And it demands faster production to enable a larger volume of work being handled.

That's why alert sheet metal men everywhere have adopted Lockformer methods. They know, BY ACTUAL TIME RECORDS MADE IN THEIR OWN SHOPS, that one man and a Lockformer can make more Pittsburgh Locks than sixteen men working at eight brakes. They know that they can make MORE MONEY PER JOB—and that they can handle a larger volume of work without increasing shop space or overhead expense.

And even if YOUR shop averages as little as 250 pounds of duct work a week, a Lockformer 24 WILL PAY FOR ITSELF OUT OF SAVINGS in six months—and, naturally, the greater the poundage fabricated, the more quickly your investment is returned.

On this basis (and we'll be glad to prove our figures) isn't it a costly proposition to continue with hand forming methods?



Lockformer prices start at \$148.00, complete and ready to plug in. Write us for literature or name of Distributor nearest you.

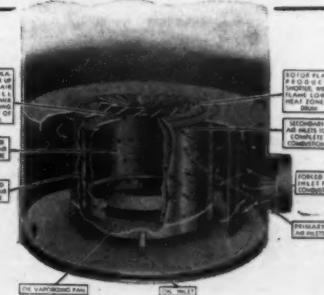
MORE LOCKFORMERS ARE IN USE THAN ALL OTHER MAKES OF LOCK ROLLING MACHINES COMBINED.

THE **LOCKFORMER** co.

4615 ARTHINGTON STREET, CHICAGO, ILLINOIS

## A NEW TYPE FURNACE WITH A NEW TYPE BURNER

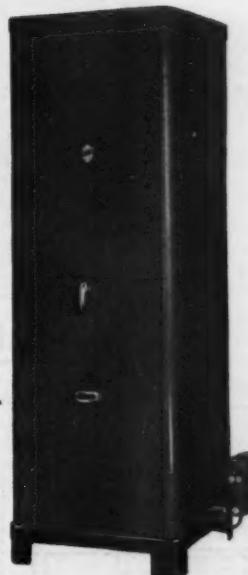
Burns With a Clean, Quiet Gas Flame Made from OIL



## The New MONOGRAM Vaporizing Turbulent Oil Burner

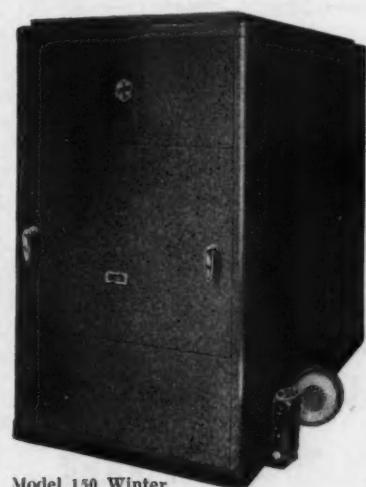
MONOGRAM Oilfire Furnaces will assure you trouble-free heating service. Features the MONOGRAM Patented "Vaporizing" burner which produces a cleaner, bluer, hotter flame by the proper mixture of both primary and secondary air with oil vapors. Based on the same principle of combustion that governs the gas burner. Absolutely no fumes, odors or soot.

Here is your chance for greater sales and more profits with MONOGRAM. Furnace models are made in all sizes, including a special job for low cost F. H. A. homes without basements. Other models include an inexpensive booster gravity unit in two sizes which will quickly and easily replace present hand-fired warm air furnaces and a full forced winter air conditioning unit in two sizes. Also proving very popular is



Model 101, Automatic Forced Warm Air Unit for Small FHA Homes.

the specially designed unit for filling stations. The heating season is just about to go into full swing so *Don't Wait*. Write us NOW for full particulars.



Model 150 Winter Air Conditioner

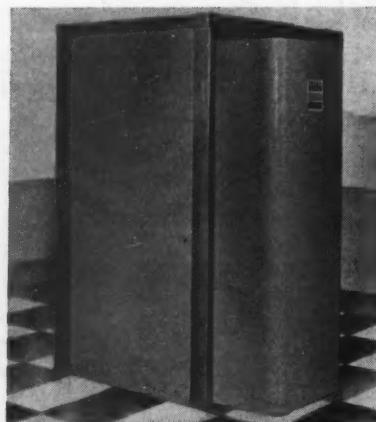
Write Us TODAY

**THE QUINCY STOVE MFG. CO.**  
QUINCY, ILLINOIS

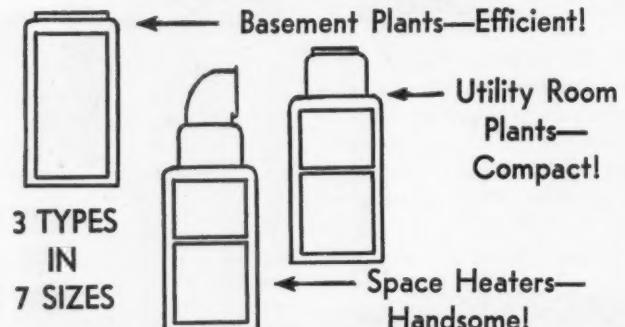
# SUN FUEL MISER

AUTOMATIC OIL FURNACES

Make You Money and Friends



## QUALITY PLUS



From 80,000 to 400,000 B.t.u. per hour

## LOOK!—Bonnet Ratings vs. Floor Dimensions

B.t.u. per hr. at bonnet	Floor Dimensions		
	Basement Units	Utility Room	Type
90,000	35 x 36	21 x 36	
125,000	24 x 48	32 x 40	
165,000	32 x 62	40 x 56	

They're PRICED RIGHT  
*for the*  
LOW COST HOUSING MARKET  
WRITE TODAY!  
J. V. PATTEN CO., Inc., SYCAMORE, ILL., U.S.A.  
200 DE KALB AVE.

# MR. DEALER

DO YOU KNOW WHAT  
DUX-SULATION  
ON *Warm Air Ducts*  
WILL DO FOR YOU?

- 1 It will raise register temperatures at least 7 degrees without increasing fuel consumption.
- 2 It will lower bonnet temperatures at least 8 degrees without lowering register temperatures.
- 3 Each 100 square foot roll of DUX-SULATION will save approximately 1 1/4 tons of coal . . . or 162 gallons of oil . . . or 37,870 cubic feet of gas every heating season.
- 4 It has a 75% Thermal Insulating Efficiency . . . Absorbs 70% of noises . . . Prevents Condensation, Sweating Ducts or Rust . . . Built to last . . . Easy to apply . . . No waste . . . Packaged for easy handling in stock or on the job.

Write office nearest you for Bulletin 402.

## GRANT WILSON, INC.

4101 West Taylor Street CHICAGO

PLANT RUBBER & ASBESTOS WORKS  
537 Brannan Street SAN FRANCISCO

AIR CONDITIONING UTILITIES CO.  
8 West 40th Street NEW YORK

ATLAS ASBESTOS CO., LTD.  
110 McGill St. MONTREAL, CANADA

## New Literature . . .

For your convenience in obtaining copies of new Literature use the coupon on page 104.

### 216—Automatic Heating Accessories Cat. 112

Robert Barclay, Inc., 122 North Peoria St., Chicago, wholesale distributors of automatic heating accessories, is distributing Catalog No. 112 for fall, 1940.

### 217—Copper and Brass Uses

Copper & Brass Research Association, 420 Lexington Avenue, New York City, is distributing Bulletin No. 111 for August, 1940, covering the physical properties of copper and brass for the air conditioning industry. Two of the 16 pages are devoted to architectural uses.

### 218—Transparent Stationary Draft Gages

F. W. Dwyer Manufacturing Company, 565 W. Washington Blvd., Chicago, is distributing Bulletin No. 31 covering their transparent stationary draft gages—for measurement of static pressures, differential readings, air velocities, and furnace drafts in heating and power plants and air conditioning units. Data on applications and specifications are included.

### 219—Automatic Heat Pays for Itself

Hershey Machine & Foundry Co., Manheim, Pa., maker of Motorstokor, has prepared a 12-page booklet entitled "Automatic Heat Which Pays for Itself with Fuel Savings," to bridge the gap between the interested prospect and the manufacturer.

The booklet is sent to prospects who return coupons from the company's national advertising. A letter, thanking the prospect for the inquiry and giving him the name and address of his nearest Motorstokor dealer is sent with the booklet. This booklet contains the minimum of technical copy about what is a highly technical problem—automatic anthracite heat.

### 220—Lessons in Arc Welding

The Lincoln Electric Company, 12818 Coit Road, Cleveland, has published "Lessons in Arc Welding"—144 pages 6 x 9 in. with over 100 illustrations, bound in a semi-flexible simulated leather, gold embossed cover. Price 50 cents in USA, 75 cents elsewhere.

The book is a series of 51 lessons, based upon experiences of Arthur Madson, instructor of The Lincoln Arc Welding School, presenting fundamental facts of welding; in four principal sections: Welding with Unshielded Arc Electrodes; Welding with Shielded Arc Electrodes; Electrodes for Particular Joints and Metals; and Hardfacing. Text explanations are graphically supplemented by line drawings and photos. A feature is questions on each of the lessons, enabling the student to check his knowledge.

The school terms is 120 hours.

### 221—Evans Uses Action Display

The Evanair Division of Evans Products Company, manufacturers of Evanoil and Evanair space heaters, announces the distribution of a new 4-piece, full-colored action display designed to illustrate its exclusive principle of reversed fan-forced air circulation.

The focal point of the display is a floor card equipped with pinwheels. This card or easel is placed in front of an Evanair and the pinwheels are revolved by the fan-forced air which flows from the bottom louvers of the heater. Two brightly colored panels consisting of two large arrows and copy also form part of the display. One is placed on each side of the heater to show where the heat is discharged. Another colorful card is placed on top of the heater to complete the visual explanation of Evans' reversed air principle, which pulls air in the top of the heater and fan-forces it from the bottom at floor level.

# Use MAID-O'-MIST

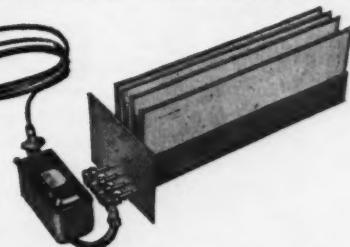
## Humidifiers for

- HIGHER EFFICIENCY
- LONGER LIFE
- LOWER COST !
- GREATER PROFIT ●

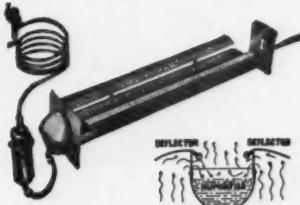
THE great American Public is becoming ever more "Humidity Conscious." Newspapers and periodicals advocate correct humidity for better health and more comfortable homes. Cash in on this great publicity . . . SELL HUMIDITY . . . and use Maid-O'-Mist Humidifiers on all your installations. Get in the swim . . . learn all about this great line that includes humidifiers for all types and kinds of heating equipment. WRITE FOR THE MAID-O'-MIST CATALOG NOW!

### CONVECTOR AUTOMATIC HUMIDIFIERS

Maid-O'-Mist Automatic Convector Humidifiers for Warm Air Furnaces and Space Heaters assure correct humidification . . . are easy to install . . . fool-proof in operation . . . last indefinitely . . . and are priced to fit every purse. Made in 18 sizes with single, double and four troughs they meet the humidification requirements of the largest or smallest furnace. The Water Feeder is made of brass, copper and Monel Metal. The Float is made of copper. All are completely nickel plated to eliminate the possibility of corrosion. Copper troughs are spaced one inch apart insuring unrestricted air flow through the Patented metal edge replaceable evaporators. Maid-O'-Mist Automatic Humidifiers are most efficient, and each installation will make a handsome profit for you. Humidifiers are shipped in attractive cartons, quickly assembled ready for installation.



### NO. 9 ZEPHYR AUTOMATIC HUMIDIFIER



Meets the demand for a highly efficient humidifier for Winter Air Conditioning Furnaces where lower ambient temperatures prevail. The Zephyr is made of sheet bronze stamped in one piece and equipped with many patented features. DEFLECTOR WINGS which direct the heated air directly over the water surface, assure maximum efficiency. WATER-BOY SAFETY FEEDER controls water level in the pan automatically . . . OVER-SATURATION CONTROL permits raising of pan to reduce evaporating area in extreme cold weather. Installation is most simple and pan can be easily removed for cleaning. Comes in two sizes, 36" and 26" lengths.

### NO. 58H MAID-O'-MIST HUMIDIFIER

Made of exactly the same fine non-ferrous materials as the Zephyr. The difference being that Wing Deflectors are eliminated and a No. 59 Automatic Water Feeder is used in its operation. Installed in Warm Air Furnaces it will mean better humidification . . . and its low cost will result in many additional sales.



### WATER-BOY MIDGET FEEDER

Designed for use with Bucket or Pan Type Humidifiers. No. 50 is made entirely of non-ferrous metals and is 7" long over all. Controlled by a nickel plated copper float which will operate in water only 1" in depth. The valve is protected from pipe scale, dirt, etc., by a Monel metal filter screen, assuring faultless operation.

*Maid-O'-Mist Humidifiers are Standard Equipment on many of the country's leading furnaces.*

MAID-O'-MIST INC.

213 North Aberdeen Street  
Chicago - - - Illinois

AUTOMATIC  
HUMIDIFIERS  
FOR ALL TYPES OF  
HEATING SYSTEMS



## New Literature

For your convenience in obtaining copies of new Literature use the coupon on page 104.

### 222—The Little Blacksmith

J. F. Kidder Mfg. Co., Inc., Burlington, Vermont, is distributing "The Little Blacksmith"—Catalog No. 40—with net prices of their punches, shears and notchers.

### 223—Condensed Catalog and Price List

McDonnell & Miller, Wrigley Building, Chicago, is distributing their condensed catalog and price list on McDonnell controls, including their Snap-Action humidifier water level control—a valve for the furnace field.

### 224—Fans and Blowers

The Peerless Electric Co., Fan and Blower Division, Warren, Ohio, is distributing an envelope stuffer covering exhaust fans, a 4-page folder illustrating and describing the complete Peerless line, and a 12-page catalog covering their exhaust fans, attic fans and utility blowers, with specifications.

### 225—Domestic Burners for Pennsylvania

The U. S. Department of Commerce, National Bureau of Standards, Washington, D. C., is circulating to the industry for written acceptance a "Recommended Revision of Domestic Burners for Pennsylvania Anthracite (Under-feed Type)." This is Commercial Standard CS48-34 (TS-2911).

### 226—Spray Equipment Catalog

The Eclipse Air Brush Company, Inc., 398 Park Avenue, Newark, New Jersey has issued Catalog No. 77, a 32-page, 8½ x 11 booklet, covering its complete line of spray

equipment for both manual and automatic operation. Included in the catalog is a section devoted to their Pneumix air-motored agitators.

### 227—Tordheet Furnaces

Tordheet Division, Cleveland Steel Products Corporation, Madison at W. 74th St., Cleveland, is distributing two 4-page circulars—one covering the Tordheet steel gravity furnaces for coal with capacities and specifications, and the other covering the Tordheet Series 65 air conditioning furnace rated at 65,000 Btu at the register.

### 228—Kno-Draft Spun Aluminum Outlet

Plandaire, Inc., P. O. Box 7350, Oakland Station, Pittsburgh, is distributing a 4-page folder covering the Kno-Draft Model SR, combination supply and return high velocity ceiling air distribution terminal, spun of aluminum, and adaptable to cooling, heating and ventilating installations—commercial, residential and industrial.

#### FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.,  
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

175	176	177	178	179	180	181
182	183	184	185	186	187	188
189	190	191	192	193	194	195
196	197	198	199	200	201	202
203	204	205	206			
216	217	218	219	220	221	222
223	224	225	226	227	228	229

Name ..... Title .....  
Company .....  
Address ..... Are you Manufacturer \_\_\_\_\_ Jobber \_\_\_\_\_ Dealer \_\_\_\_\_



## SAL-MO ASBESTOS PRODUCTS

CLEAN-UP time for Warm Air Heating Equipment means many re-cemented and re-insulated Furnaces. With this trio of well known Asbestos Products you can be sure of a repair job or a new installation of Heating Equipment that you can GUARANTEE to do the winter's heating job in a satisfactory manner.

See your nearest jobber. He can furnish you with the proper type of SAL-MO Insulation—Plain and Corrugated Asbestos Papers, Furnace Cements and Pipe Coverings for all uses.

## SALL MOUNTAIN COMPANY

176 WEST ADAMS STREET  
CHICAGO, ILLINOIS

# Investigate this *Tropic Breeze* HI-BOY WINTER AIR CONDITIONER

## DALZEN MULTI-TIP CONVERSION GAS BURNER

for every type of  
Heating Plant

Quickly and easily installed in steam, hot water, hot air or vapor systems. Produces more heat from a given amount of gas. Unit includes latest type thermostatic and safety controls. Priced to sell in TODAY'S market—at profitable discounts to dealers. Write us today for full information.

## DESIGNED for GAS OR OIL!

Tropic Breeze Burner assemblies are interchangeable for gas or oil firing. Owner can change either from gas to oil or oil to gas—at small cost. Unit takes little more than four square feet of floor space, is not too high for cellar installation, yet perfect for utility room. Will pass through a 28" door. Oil-fired models offered in two burner types—gun and mechanical draft pot. Gas-fired model includes Dalzen Multi-tip burner. A packaged unit, designed for economy, beautifully finished for eye appeal, fully automatic. Priced right—profitable to handle.



Above is shown Model 100-OPG Hi-Pressure Gun Type burner which will render service-free combustion when firing as low as 7/10ths gallons per hour. Model 100-OPP with Oil Power Pot has all parts completely concealed by the upper door.

**DALZEN MANUFACTURING CO.**  
511 Leib Street • Detroit, Michigan

● The Skuttle Automatic Humidifier Series 200 is 18" to 30" long, 2" deep and 3" wide with ceramics that extend beyond the pan to give proper humidification. Can be easily installed in the plenum chamber of any warm air furnace. MANUFACTURERS: Special sizes can be made to your specifications.

WRITE TODAY FOR

J. L. SKUTTLE COMPANY

**Skuttle**  
AUTOMATIC HUMIDIFIERS

INFORMATION

999 FRANKLIN ST., DETROIT, MICH.

Quick trigger release speeds up roll forming operations . . . upper slip roll swings forward horizontally for easy operation without lifting.

Write for Catalog 94

**NIAGARA MACHINE & TOOL WORKS**  
BUFFALO, N. Y.  
BRANCHES: NEW YORK CLEVELAND DETROIT



**DRIP . . . DRIP . . . DRIP . . . Directly on a Hot Pan Surface!**

## Give Your Customers This More Effective, More Dependable Method of Water Evaporation



Another Extra that Tells You

**THERMO-DRIP**  
is the best  
buy



A thin layer of water in a pan heats and vaporizes faster than a brimful pan of water. The drip feed keeps only a sheath of water in Thermo-Drip's light gauge, uncoated, stainless steel pan.

An automatic humidifier is no longer a tricky thing to sell. Not when you handle the THERMO-DRIP Humidifier. Its drip feed—automatically stepped up or throttled or shut off, depending upon furnace bonnet temperatures—is a principle householders understand and recognize as a sensible, more practical, more scientific method of water evaporation. It isn't necessary for you to think up "fancy comebacks" when you offer this amazing humidifier. Cash in on it. Push THERMO-DRIP! Send for complete details.

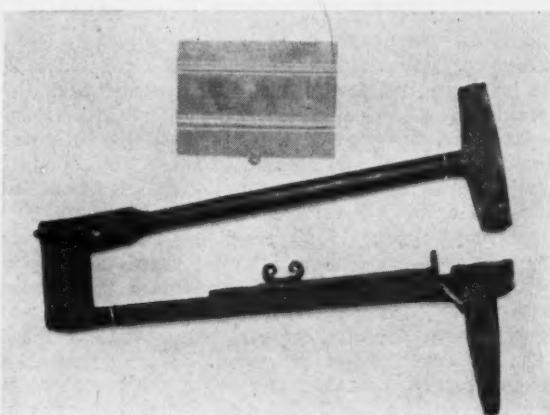
**AUTOMATIC HUMIDIFIER CO.**  
18th and Main Streets      **CEDAR FALLS, IOWA**

**THERMO-DRIP**  
*Automatic HUMIDIFIER*

## News Items . . . . .

### **Anyone Recognize This Tool?**

Frank E. Helzel, 306 N. Bay St., Eustis, Florida, sends the accompanying photograph which he says shows a beading machine. The work the tool does shows above



the tool. Mr. Helzel says the tool is apparently very old and was given him by a friend who found it among his father's possessions. Mr. Helzel would like to have anyone who recognizes the tool and can supply information on its history or use, write him.

Every part of the tool is hand wrought, apparently, even the thumb nuts and threads. The tool makes two sizes of bead. The female die has both sizes of bead, one in front of the other, while the male die has one die on either end of the hammer head. To change from large to small bead, you remove the thumb screw at the back, invert the hammer, and move it back to the second hole. The gauge is adjustable. The name J. North is stenciled on the side.

### **Expense Allowance Counted As Wages**

Payments made to workers for expenses incurred in connection with their employment are considered as wages subject to the Illinois Unemployment Compensation law unless a regular accounting of such expenditures is required by the employer, State Director of Labor Martin P. Durkin announced recently.

"Many employers make a flat weekly or monthly allowance to certain workers for expenses," said Director Durkin. "In some instances these employees do not have to account to their employer as to how, when, or where this money was spent."

"In such cases these expense payments are held by the Division of Placement and Unemployment Compensation to be a part of the worker's regular wage. Employers must include such payments in their quarterly report of wages payable to each worker and contributions must be paid on the amount of such payments."

"Only when expenses are currently reported to the employer may they be deducted from the amount of wages subject to contributions."

For 1940, wages on which contributions must be paid include all payments in cash, including commissions and drawing accounts to salesmen, and the reasonable cash value of payments in a medium other than cash, such as lodging, meals, and rent due for services performed by the worker for his employer. In instances where special awards in the form of gifts or prizes are given, the cash value of such merchandise must be counted as wages subject to contributions.

Director Durkin also pointed out that beginning with 1940 employers covered by the State Unemployment Compensation law are required to report and pay contributions on only the first \$3,000 payable by them to any individual in their employ during a calendar year.

**PLIAVANE  
DESIGN  
ADJUSTIBLADE  
REGISTER**



### **MULTI-SHUTTER OR SINGLE VALVE . . . PLIAVANE IS THE ANSWER**

Here is a modern register which provides for individual adjustment of the face vanes at a very low cost. Furnished with the standard type single valve damper or with the Adjustiblade Multi-Shutter feature. In the single valve construction the air flow can be deflected up or down to satisfy any condition. In the Adjustiblade Multi-Shutter register the face vanes provide sidewise deflection while the air stream may be directed up or down by the back blades, making it possible to meet every problem of air distribution.

**PLIAVANE DESIGN  
SINGLE VALVE REGISTER**



*Send for Catalog  
today.*

**TUTTLE & BAILEY, Inc.**

**NEW BRITAIN,**

NEW YORK

CHICAGO

CONI

PHILADELPHIA

## HERE'S GREAT NEWS about TWO New Controls

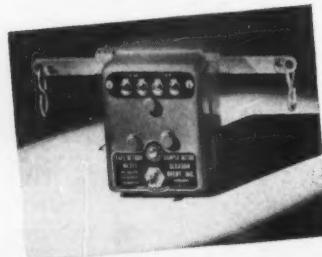
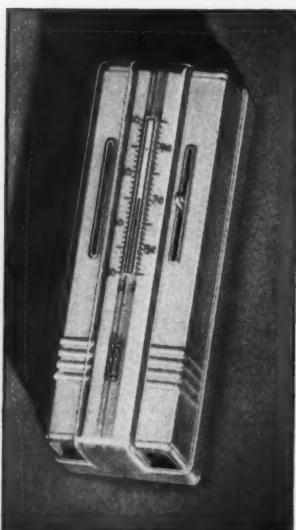
### The New **G-A** MIRROR-LITE THERMOSTAT

- UNIQUE NEW FINISH
- SMART, MODERN STYLING

Now meet the demand of your large market of hand-fired heating plants with this new G-A MIRROR-LITE . . . smartly styled for greater eye-appeal . . . faster selling . . . greater profits!

It represents the first application of transparent plastic in the thermostat field—gives quicker, easier readability. And the unique finish of the MIRROR-LITE is permanent—won't wear off, can't fade or scratch. Lends a soft, mirror-lite tone that blends well with any decorative scheme. Its smart, modern beauty . . . its sensationally low price . . . plus its proved sensitivity and dependability will make more of your customers want to buy it.

Check these fast selling features of the new MIRROR-LITE yourself—rush your trial order today—compare it with any other thermostat on the market . . . in beauty, features, price and PROFIT!



### The New **G-A** SAFE-RETURN DAMPER MOTOR with Spring Return

Designed for greater safety, featuring positive straight line control—exclusively G-A—that prevents chain from tangling. AND IF CURRENT FAILS, SPRING RETURN CLOSES DRAFTS INSTANTLY. Terminals outside case. Mounted in any position.

#### WRITE FOR FOLDER AND SPECIAL TRIAL OFFER

Send us a postcard now for descriptive folders and SPECIAL TRIAL OFFER—detailed information about these 2 new controls, as well as the complete G-A line will be mailed immediately.

#### DISTRICT REPRESENTATIVES

The H. M. Flemming Co., Inc.  
30 Church Street  
New York City

General-Associated Oil  
1214 Springgarden St.  
Philadelphia, Pa.

Mr. Fred W. Forward  
520 West Boulevard  
Elkhart, Indiana

Mr. Floyd T. Whitney  
5736 12th Street  
Detroit, Michigan

Smith & Dale  
457 Stuart Street  
Boston, Massachusetts

R. W. Anderson & Co.  
67 Carlton Street  
Toronto, Ontario

**GLEASON-AVERY, Inc.**  
19 Clark Street Auburn, N. Y.

## News Items . . . . .

### Defense Training Enrollment in Schools

Federal Security Administrator Paul V. McNutt recently forwarded to the National Defense Advisory Commission a report received from John W. Studebaker, U. S. Commissioner of Education, on the vocational education national defense program.

This report shows that in one month's time 80,614 persons have enrolled for defense training and that already approximately 3,000 men have been placed in jobs. In one community alone—Paterson, N. J.—686 persons have been trained and placed since July 1. These placements have been in three very important national defense industries located in or near Paterson.

Men and boys 18 to 60 are being trained in summer schools opened for the special purpose of training workers for defense industries. A few women are enrolled in places where such industries require women workers.

Two types of training are provided by vocational schools in the national defense program. Pre-employment short courses giving instruction in specific skills such as welding and riveting enroll 51,604 men. Supplementary courses that aid workers on the job, who attend school to extend or improve their skills, have 29,010 registrants. Skills for which training is being provided include: Blue print reading, lathe work, milling, chipping and filing, parachuting-making, welding, riveting, tool-making, auto mechanics, aviation mechanics, pattern-making, drafting, electricity.

### Fire Prevention Week

The National Fire Protection Association, 60 Batterymarch St., Boston, announces Fire Prevention Week dur-

**Furnace Men Say**

**THARCO**

**First, Last and**

**ALWAYS**

**THE ARMSTRONG COMPANY**

DETROIT DALLAS CHICAGO

ing the week of October 6-12. The latest estimation of annual fire losses by causes lists:

	No. of Fires	Loss
Chimneys, flues—defective or overheated.	54,000	\$15,400,000
Sparks on roofs . . . . .	63,000	9,800,000
Hot ashes, coals . . . . .	15,700	2,900,000
Oil Burners . . . . .	7,000	1,450,000

### Mid-West Heating Celebrates Expansion

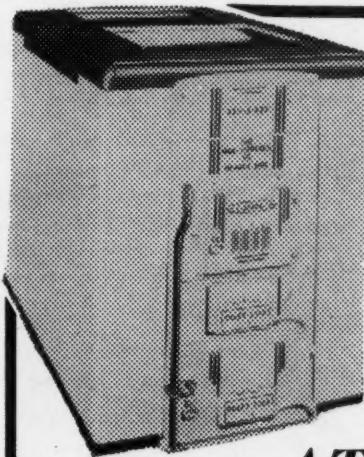
The July 7 issue of The Indianapolis Sunday Star carries a full page devoted to the Mid-West Heating & Service Company's general offices, sales and display room at 724 East Ohio Street, occupied a year ago. There is a picture of the former one-story building at 2921 East 10th as compared with the present building which is three times larger; a view of the drafting department and furnace display room; and a picture of E. L. Carr, president of the company, Donald S. McCloskey, chief heating engineer, and of salesmen Ralph E. Mullen and M. D. (Todd) Toliver.

The plant makes practically all of its own sheet metal work, the fabrication of furnace casings, blower housings and trunk line work for heating and air conditioning systems. The company also manufactures its own gutters, skylights, marquees and canopies.

Mid-West handles an exclusive line of Weir and Meyer steel furnaces and air conditioning apparatus, manufactured by Meyer Furnace Company at Peoria, Illinois, and cast iron furnaces made under the name Mid-West. The company also handles Certainteed roofing.

### C. H. Lighthart Moves

C. H. Lighthart, factory representative and distributor of air conditioning specialties—heaters, registers, complete coal, oil and gas units, circulating blowers, humidifiers, controls and filters—moved on June 1st from his old quarters at 254 Court Street to 511 Rhode Island St., in Buffalo. Mr. Lighthart says the new location has very definite advantages.



- ★ Modern
- ★ Efficient
- ★ Durable
- ★ Economical

### ATH-A-NOR AIR CONDITIONING UNIT

The ATH-A-NOR Deluxe is designed to meet the ever increasing demand for a modern, efficient, durable and economical air conditioning unit. The new full height front is pleasing in appearance as well as modern in design to enable you to sell the Home-owners who have new or recently modernized basements.

The ATH-A-NOR line of furnaces has a model to meet every price and every purpose. Available for coal, oil or gas firing, the versatility of these units make them standouts in the field.

We suggest you drop us a line today for further information.

**THE MAY-FIEBEGER COMPANY**  
NEWARK OHIO

## GET ON THE BANDWAGON



### THE BIG SWING IS TOWARD PERMANENT AIR FILTERS

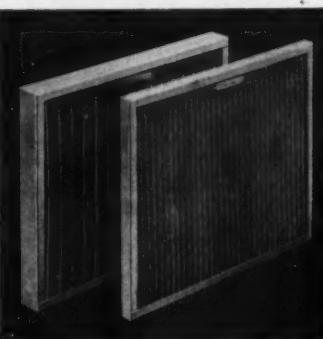
Users today know more about air conditioning equipment . . . and expect more. They know that they can't have maximum performance without thoroughly efficient air filter panels . . . permanent, cleanable air filter panels.

Naturally, the customer is the boss and this explains why manufacturers and dealers in air conditioning are swinging more and more to AIR-MAZE Kleenflo air filter panels for initial installation.

With their tested efficiency of 98.0% to 99.6% AIR-MAZE Kleenflo panels insure dependable trouble-free performance throughout the life of the air conditioning system. They are more economical, too, in the long

### WRITE FOR 1940 CATALOG

AIR-MAZE Kleenflo filter panels can be furnished in any reasonable size or shape to meet the requirements of any air conditioning system. Write for copy of 1940 Catalog.



### APPROVED BY THE UNDERWRITERS LABORATORIES

AIR-MAZE Kleenflo panels are of scientific all metal construction, sturdy, odorless and approved as fire retardant by the Underwriters' Laboratories. They give your customers everything they have a right to expect.

**AIR-MAZE CORPORATION**  
5130 HARVARD AVE. CLEVELAND, OHIO

**AIR-MAZE**

**"Performance Sells**

# LAU

## BLOWERS!"

**Manufacturers**

**Dealers**

**Users**

Manufacturers, Dealers, Users find LAU Blowers  
More Efficient and More Quiet

In the final analysis, there's just one thing anyone wants from a furnace blower . . . that's dependable, economical PERFORMANCE . . . the kind you get day after day, month after month from a LAU BLOWER.

Throughout the industry research engineers for manufacturers have made countless tests in search for a blower that excels in quietness, efficiency, and dependability . . . and more often than not have decided on Lau Blowers.

Dealers from coast to coast acclaim these blowers for the satisfaction they assure customers . . . no kick-backs and far fewer service calls involved.

Users tell us the way to keep the upkeep down is to insist on Lau Blowers in air conditioning installations.

Make sure the air conditioning unit you sell is equipped with a Lau unit. Lau also makes standard package units, wheels, casings, pillow blocks, and attic fans . . . all embodying the same skill in Lau engineering design and precision quality workmanship.

Write Lau for complete information, catalog, and prices.

*Write*

THE LAU BLOWER CO.  
2005 Home Ave. Dayton, Ohio

BLOWERS • FANS • WHEELS • PILLOW BLOCKS

**LAU**

THERE'S A SALES ENGINEER NEAR YOU

## With the Manufacturers . . .

### A. L. Morris Shop and Show Room

A. L. Morris, owner and operator of the Mueller Furnace Sales Company, Portland, Oregon, has acquired a new shop and salesroom at 4069 N. E. Union Avenue, one of



the principal thoroughfares. The showroom has Neon lighting. Several of the units are actual working displays.

This company started out on a small scale and has built up its business over a period of years to the point where it now enjoys considerable volume of business in all phases of heating and air-conditioning equipment—coal, oil, gas.

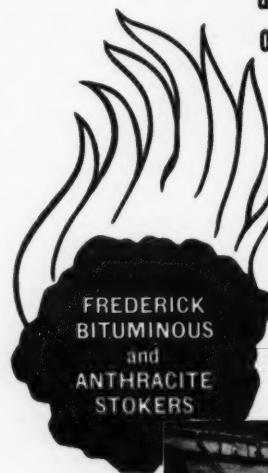
### General Controls, Kansas City, Moves

General Controls Co., Glendale, California, manufacturer of pressure, temperature and flow controls, announces a change in address of their Kansas City office to 421 Southwest Boulevard.

Larger quarters at this new address will permit the company to carry larger stocks and increase the scope of service in that territory.

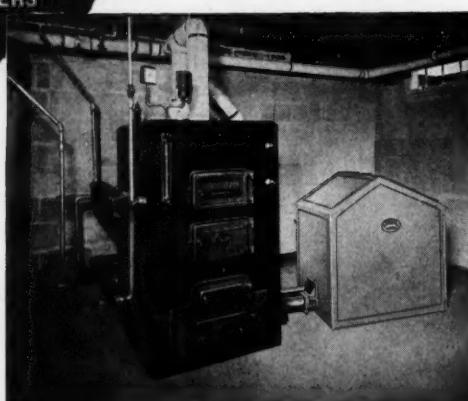
The office is in charge of E. V. Bialik, sales engineer.

A TYPE FOR EVERY HOME and HEATING PLANT  
at Prices well within the scope  
of YOUR CUSTOMERS' BUDGETS!



A stoker almost custom-made to the needs of the customer . . . easy to sell . . . doubly easy to sell at FREDERICK'S reasonable prices. Gives you more action for your efforts—because it gives your customers more for their money!

(Ask about Liberal Dealers' Proposition; some good territory is still open.)



*"Builders of  
Good Stokers  
for Twenty  
Years"*

The FREDERICK IRON & STEEL CO.

East Street,  
Frederick, Maryland

### Hutcheon Joins Plandaire, Inc.

Clifford R. Hutcheon, formerly with Anemostat Corporation of America, has been appointed chief engineer for Plandaire, Inc., manufacturers of Kno-Draft Spun Aluminum high velocity ceiling type air terminals. Mr. Hutcheon will be in complete charge of production, research and development. Plandaire's offices and test laboratories are located at Craft Avenue and Kennett Square, Pittsburgh.

### Parade of Progress

Minneapolis-Honeywell Regulator Company, Minneapolis, has been holding "Parade of Progress" meetings throughout Illinois, Indiana, Iowa and Kentucky, as follows:

Joliet, Ill. ....	August 28
Rockford, Ill. ....	August 30
Davenport, Iowa .....	September 4
Quincy, Illinois .....	September 6
Peoria, Illinois .....	September 11
South Bend, Indiana.....	September 13
Fort Wayne, Indiana.....	September 18
Indianapolis, Indiana .....	September 20
Terre Haute, Indiana.....	September 25
Louisville, Kentucky .....	September 27

In addition, meetings will be held in Metropolitan Chicago.

Sales promotion ideas, developments, avenues of profit, and the new M-H control equipment are features of these meetings. Entertainment, music and refreshments are given.

### Davis Represents DeBothezat

DeBothezat Ventilating Equipment Division of American Machine and Metals, Inc., East Moline, Ill., announces the appointment of Walter C. Davis to cover the Maryland and District of Columbia territory, with headquarters at Baltimore.

## Compare MAUREY V-PULLEYS

### With Any V-Pulleys Made



STEEL



VARIABLE



CAST IRON

... and you will readily see why so many builders of high grade Air Conditioning and Refrigeration Units, Blowers, Fans and Stokers find that MAUREY V-PULLEYS save time and money.

MAUREY STEEL V-PULLEYS are designed and built to give maximum service. Made of heavy steel with machined steel or malleable hubs—not die cast.

MAUREY VARIABLE PITCH PULLEYS of cast iron construction. Speed adjustment of as much as 30%. Fine, accurate, milled threads, 20 to the inch assure close adjustments. In 5 sizes—3 1/4" to 5 1/2" O. D. For Air Conditioning Units.

MAUREY CAST IRON V-PULLEYS are made on a new principle of design that permits freer flow of air through spokes. Balanced and true-running, they are much sturdier than pulleys of the usual design. Grooves machined to micrometer accuracy.

Send for Circulars and Prices.

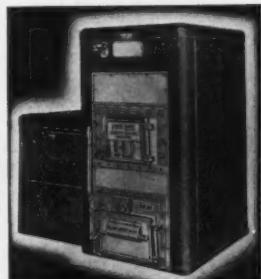
**MAUREY MANUFACTURING CORP.**  
Wabash at 29th, Chicago, Illinois

## SALES ARE BOOMING on



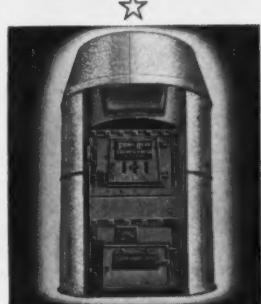
Complete line of Warm Air Heating Units!

**HERE'S WHY:** They say that performance always tells! And 52 years of economical, dependable performance is the record set by FRONT RANK and MELLOW Heating Equipment. All units have a certified rating by the National Warm Air Heating and Air Conditioning Association . . . and Front Rank's efficient performance can easily be gauged by the fact that the Illinois University gives it a 15% higher rating than we, ourselves, claim. With this easy selling and complete line, which includes Oil Burners, Registers, Forced Air Equipment, Hand Fired and Stoker Fired Furnaces, YOU CAN'T HELP BUT MAKE MONEY!



"FRONT RANK" Winter Air Conditioning Furnace

Embodying the latest improvements that contribute to health, comfort, convenience and economy. Attractively finished in green morocco baked enamel. Priced to sell in competition.



"FRONT RANK" Steel Furnace

Has been tested and proven in actual service over a period of 52 years by more than 350,000 owners. Designed to last a lifetime. As a dealer, you cash in on the reputation FRONT RANK has established.



"MELLOW" Cast Iron Furnace

Has been engineered to distribute maximum heat with minimum firing. Leak proof to prevent gas or smoke from escaping. Over-sized automatic humidifier EXTRA HEAVY. The favorite of thousands. Popular priced.

ACT NOW . . . there's still time for you to join our rapidly growing dealer organization and get your share of the 1940 profits. WRITE AT ONCE FOR COMPLETE INFORMATION.

FURNACE DIVISION  
**Liberty Foundry Co.**  
2500 OHIO ST. • SAINT LOUIS, MO.

FREE

**FIRELINE BULLETIN**

Published in the Best Interests of Every Furnace Man

EXTRA

Vol. I, No. 1

September, 1940

Section I

# NATIONAL EMERGENCY

## FIRELINE AGAIN MEETS NATIONAL EMERGENCY



### Fireline Is Most Profitable to Furnace Men

Experience has proven that Fireline Service is highly profitable furnace work. First, it greatly increases the furnace man's market for everyone becomes a prospect . . . the multitudes who feel that they can't afford a new furnace, the home owner who can't afford new castings, the man with the obsolete, orphan furnace who can't get a new firepot, the man who has bought a new furnace and can afford to have it made burn-out-proof, and the man whose furnace has broken down in mid-winter who wants heat the same day.

Though far more economical for the home owner, Fireline work pays the furnace man a higher hourly rate than ordinary furnace work, and on every furnace rebuilding job or new furnace installation, it offers a legitimate extra sale and extra profit—adds to the profit on all regular work and brings in work you could never get without it.

*Act today! Fireline is stocked by leading jobbers in 50 and 100-lb. drums. Order from your jobber or write us for bulletin, prices, and sales helps.*

### Saves Hundreds of "Hopeless" Firepots each month

With the plague of burned-out furnaces that, after 9 years of depression has left one out of every 3 furnace firepots in America cracked or broken, the discovery and increasing use of Fireline has become of greatest importance in meeting this national heating problem.

Faced with literally millions of chilly homes, with furnaces everywhere that are incapable of doing a complete heating job and with home owners who can't afford even new firepots let alone new furnaces . . . surrounded by orphan models and furnaces needing replacement castings obtainable only from distant manufacturers—furnace men have turned to Fireline, the new firebrick material that repairs burned-out firepots and permits heat the same day.

With Fireline stocked by furnace supply houses, hardware jobbers, furnace men everywhere, home owners need no longer huddle over registers, suffer from furnace gas, or go days or weeks without heat.

The modern furnace man repairs broken firepots in a few hours and increases the original heat producing capacity of the furnace . . . all with Fireline. Installed one to 1½ inches thick over the entire inside wall of the firepot, Fireline sets with an ordinary fire into a one-piece firebrick lining. It makes cracked or broken firepots tight and burn-out-proof and increases combustion temperature and gets more heat from fuel. It burns up gas, smoke, soot, reduces waste in ashes and cuts fuel bills. By sealing all cracks and holes, Fireline prevents the escape of gases, odors, and dirt into the house.

### FIRELINE STOVE & FURNACE LINING CO.

1816 Kingsbury Street, Chicago, Illinois

Gentlemen:

Please rush me complete information, prices and sales helps on:

Fireline ..... Ironset .....  
Name .....  
Street .....  
City ..... State .....

## With the Manufacturers . . .

### Barnett is Airtemp's Sales Manager

D. W. Russell, president of Airtemp Division, Chrysler Corporation, announces the appointment of Ward H. Barnett as merchandising manager. In his new assignment, Mr. Barnett will promote and coordinate the rapidly expanding Air Conditioning and Heating Sales of the Airtemp Division.

### Green Foundry Changes Name

Shirley Percival, president of the Green Foundry & Furnace Works, Des Moines, Iowa, announces a change in name to Green Colonial Furnace Company. No changes have been made in the firm's management, ownership or location at southwest Third and Elm Streets.

The tradename "Colonial" has been used on most of the firm's products since 1907.

### Allied Heating Handles Walton Filters

The Research Products Corporation, Madison, Wis., has appointed the Allied Heating Products Company, 225 Brokers Exchange Building, Norfolk, Virginia, as its agent for the State of Virginia to handle the distribution of the Research (Walton) Air Filters. Mr. J. M. Stokley is the President of Allied Heating Products Company.

### Penn Boiler & Burner Appointments

Penn Boiler and Burner Mfg. Corporation, Lancaster, Pa., announces the following appointments:

A. L. Frank, formerly southern sales manager for York Oil Burner Company, has been appointed southern sales manager.

A. H. Townsend, formerly with Sears, Roebuck & Company, is in charge of the Philadelphia territory.

C. M. Spangler in charge of the New England.

## Become the LEADING MERCHANT IN YOUR TERRITORY WITH *Gar Wood* HOME COMFORT-PROVIDING EQUIPMENT

### SUSTAINED LEADERSHIP

Gar Wood automatic home heating and air conditioning furnace-burner units led the nation in percentage of total sales in 42 key markets for the last four consecutive years—according to statistics published by a national trade authority. Cash in on Gar Wood's sales popularity. Become a prosperous leader in your community. Write or wire for the Gar Wood franchise facts.



**PRODUCTS**  
Oil- or gas-fired automatic Tempered-Aire Winter Air Conditioning and Heating Units—Split Systems—Boiler-Burner Units—Conversion Oil Burners for existing Boilers or Furnaces—Domestic and Commercial Water Heaters—Vaporizers—Airdux System for air distribution and control. Ask or write for descriptive literature.

### Sell NATIONALLY ACCEPTED PRODUCTS

**GAR WOOD INDUSTRIES, Inc.**

AIR CONDITIONING DIVISION • DETROIT, MICHIGAN

CANADIAN DISTRIBUTORS—ENGINEERING INDUSTRIES LTD. TORONTO, ONT.

## Osborn Establishes Cincinnati Division

The J. M. & L. A. Osborn Co., Cleveland, announces the establishing of a new Cincinnati division through the purchase of the assets and good will of the Moise Steel Co. of Cincinnati.

Operations of this new Osborn division will be conducted by the former Moise personnel and from the same location at 3240 Spring Grove Avenue, where a greatly increased stock is now being carried.

### Bullion Joins Lochinvar

Effective August 1st, T. E. Bullion became sales manager of Lochinvar Products, Dearborn, Michigan. Mr. Bullion was formerly director of sales and advertising for Detroit-Michigan Stove, was with The Rudd Manufacturing Company for ten years, sales manager for Eureka Vacuum Cleaner Company for ten years, and previous to his connection with Lochinvar was with The Detrola Corporation.

### Pittsburgh Plate Products

Pittsburgh Plate Glass Company, 2115 Grant Building, Pittsburgh is distributing "Pittsburgh Plate Products" for July-August, 1940. "A Home Complete for \$2,500" is pictured and described.

### Weather Magic

Trane Company, LaCrosse, Wisconsin, is distributing No. 4 of Vol. 4 of "Weather Magic" covering Trane as a collaborator with trade and profession in heating, cooling and air conditioning equipment.

### Acoustical Treatment

The Celotex Corporation, 919 N. Michigan Avenue, Chicago, is distributing No. 3 of Vol. 7 of "The Quiet Forum." The text and illustrations cover acoustical treatment.

## Sell It . . . Install It With CONFIDENCE



Simplicity of operation and ruggedness of construction insure the long life and trouble-free use of this regulator. No dissatisfied customers — no failures to result in service calls.

## MASTER HEAT REGULATOR TYPE A-23

This positive, snap action regulator operates on a differential of only  $\frac{1}{2}$  degree. Accurate, dependable, low cost, it will outlast the heating plant itself. Operates quietly, surely, and safely—to the complete satisfaction of the most exacting user. Write us today for Bulletin giving complete information on the Master line.

Makers of Dependable Regulators for Over 20 Years

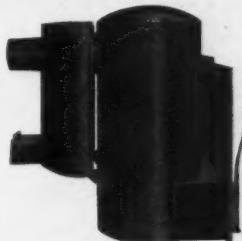
**WHITE MFG. CO.**  
2368 University Ave. ST. PAUL, MINN.

A complete line  
from  
one source . . .

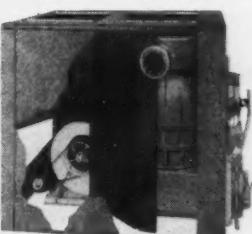
WITH cast and steel furnaces, air conditioners, oil burners and stokers, Round Oak offers you a complete line of highest quality; one company to deal with; one center of responsibility; less work, more sales.



Moistair Blended-Iron Gravity Furnace . . . a leader in your big volume market. Has many exclusive features.



Boiler Plate Steel Gravity Furnace of exceptionally fine construction. In sizes to meet all requirements.



LX Coal Fired Air Conditioner — a compact package unit for winter air conditioning. Complete with necessary equipment.



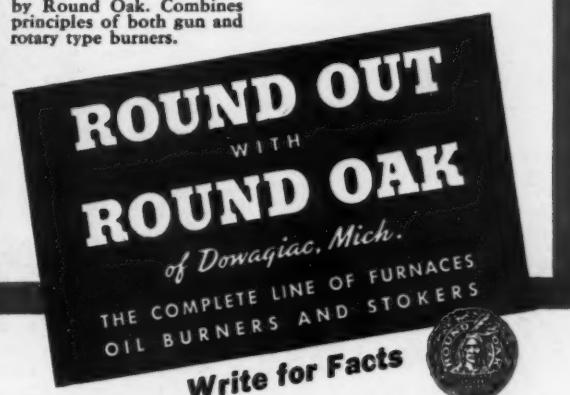
XA-80 Oil Furnace and air conditioner. Easy to sell because of amazing operating economy. Priced right.



Oil Burner built exclusively by Round Oak. Combines principles of both gun and rotary type burners.



Modern Coal Stoker . . . a mechanical masterpiece. Finest iron construction, efficient, dependable. Priced to sell!





**...PROTECTING  
Your  
REPUTATION  
AS WELL AS  
OURS!**

Before and beyond A.G.A. approval, every PAYNE appliance must meet the Industry's *top* requirements for design, safety, and performance. ★ Even "Blue Star" standards are far exceeded at our own "proving grounds", manned by PAYNE technicians whose one goal is *perfection*. ★ Here, innovations constantly developed by PAYNE'S famed engineering staff must pass rigid, relentless tests. Thus, you—the Gas Heating Appliance Dealer of America—may stake *your* reputation, along with ours, upon their quality.

#### HOW ABOUT YOU?



Backed by generous advertising in leading consumer and architect publications, Payne Dealers are slated for their biggest year of all. We have a generous dealer plan and are prepared to discuss it with you, if your sales territory is open. Address your inquiry to J. H. Keber, Sales Manager.

PAYNE vented gas appliances include Modern Console Heaters, Floor Furnaces, Duplex Furnaces, Forced Air Units, Zoneair Units, Gravity Furnaces.

**PAYNEHEAT**  
*Payne FURNACE & SUPPLY CO., INC.*  
BEVERLY HILLS • CALIFORNIA

## Finding Decimals On Any Inch Scale

SINCE ordinary squares and rules lack decimal divisions, the sheet-metal worker is obliged to translate decimals into the fractional inches as shown on his square.

For instance, to make an 11-inch pipe, first find the circumference, thus:  $11 \times 3.1416 = 34.5576$  inches. Now, set down this number and multiply the decimal by 2, after this fashion:

$$\begin{array}{r}
 (34).5576 \\
 \quad \quad \quad 2 \\
 \hline
 (1).1152 \text{ halves.} \\
 \quad \quad \quad 2 \\
 \hline
 .2304 \text{ fourths.} \\
 \quad \quad \quad 2 \\
 \hline
 .4608 \text{ eighths.} \\
 \quad \quad \quad 2 \\
 \hline
 .9216 \text{ sixteenths; (one sixteenth nearly.)}
 \end{array}$$

This done, the answer on the square or yard-stick

**"BB"**  
The mark of quality  
on sheet metal and  
roofer's supplies

**BERGER BROTHERS CO.**  
229-237 ARCH STREET, PHILADELPHIA, PA.

EAVES TROUGH  
GUTTER HANGERS  
CONDUCTOR PIPE  
CONDUCTOR FASTENERS  
MITRES  
END PIECES AND CAPS  
CONDUCTOR HEADS  
ORNAMENTAL STRAPS  
VENTILATORS, ETC.

becomes:

Thirty-four plus one-half plus one-sixteenth inches, which is accurate enough and easy to measure with tools at hand.

Note that the multiplication of the decimals by 2 continues until sufficient accuracy is obtained and until the product becomes nearly or quite an integer, which is taken to be a unit, as in the case of sixteenths in this example, and which may become more than a unit, as in the case of halves in this example, where the integer is placed in parenthesis as part of the answer not to be further multiplied; or the integer may be merely underscored as the multiplication proceeds, to show that they are parts of the answer, and not to be multiplied.

#### Brightening Old Work for Joining on New

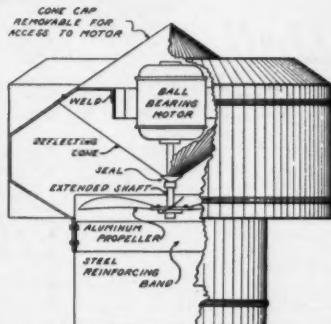
Where an old system is being revamped, or where additions are being made to old work, tarnished condition of the metal often makes it quite difficult to join on with new, especially at points where it is necessary to solder the old and the new together. In order to brighten up the old metal in good condition for soldering, and to do it with a reasonable expenditure of labor, a rotary wire brush of small size, that can be used in connection with a portable electric tool or at the end of a flexible shaft, can be used to advantage. It is possible to have a small arbor with a shank that will fit into the chuck of the electric drill, so that the portable drill can be used for such brushing and brightening. The arbor, with the little brush permanently mounted, can be kept right in the tool kit, and placed in the drill when needed.

## ISOLATED MOTOR FAN VENTILATOR

Allen "Isolated Motor" Fan Ventilators are designed and built for use under extremely corrosive conditions, to protect against steam or gases below and the elements above. This construction, which places the motor within the conical housing at the top, not only protects the motor from damaging fumes, but also adds 5% to 10% to ventilation capacity.

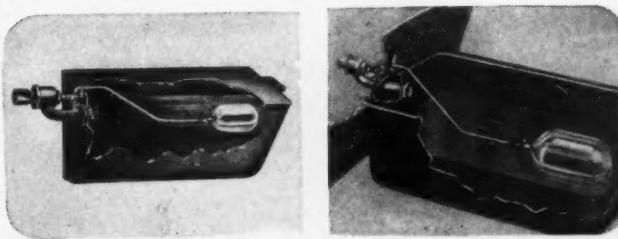
This type ventilator also reduces height to absolute minimum, being no higher than gravity ventilators of equal size.

Detailed specification sheets of Isolated Motor Fan Ventilators, also of regular *Alco* and Standard Fan Ventilators, Allen Turbine Fan Ventilators, Auxiliary Fan Sections, and Allen Remote Drive Fan Sections, will be sent promptly on request.



## The ALLEN Corporation

9752 Erwin Avenue, Detroit, Michigan



## THESE M-VB HUMIDIFIER VALVES ARE NEW AND BETTER AND BUILT TO "TAKE IT"!

The No. 300 and No. 305 M-VB Humidifier Valves have the valve mechanism mounted on the outside of the furnace or air-conditioning unit. They have the new M-VB Pyrex Glass Float. And these two features mean an end to corrosion troubles due to the mineral content of the water.

Both of these Humidifier Valves are M-VB quality all the way through with heavy brass castings and accurate machining. They're *big, quality-constructed units*—plenty big enough for long, dependable service life—yet they set a new low in price for valves with outside working parts.

No. 300 and No. 305 each has large passageways in the valves that insure minimum water-rush and splashing even under relatively high water pressures.

If you manufacture—or sell—or install warm air furnaces or air-conditioning equipment you'll want the full details on these new and better humidifier valves right away. Get in touch with your manufacturer or M-VB.



**M-VB**  
MORENCY-VAN BUREN DIVISION  
SCOVILL MANUFACTURING CO.  
Sturgis, Michigan  
SCOVILL SAVES YOU TIME IN SELLING—TIME IN INSTALLING

Complete lines of humidifier valves maintained at  
Waterville, Connecticut — San Francisco and Los Angeles, California



**Make More  
SALES**  
with the  
*Business Getting Features*  
of the  
**Swartwout  
AIRJECTOR**  
Name Registered U.S. Patent Office

Are you cashing in on the profitable ventilating business created by new factories, warehouses, expansion jobs? The Swartwout Airjector has business-getting features that make more sales for you.

It fills the need for adaptability—functions as a *power* or a *gravity* ventilator, as conditions require. Propeller type fan—greater capacity for power used; operates at low cost, very little maintenance expense. Rotary principle insures discharge always with the wind, thus eliminating static resistance.

You can't afford to use equipment that takes extra figuring or complicated installation. Swartwout Ventilators are made to exacting specifications—come to you ready to install quickly, economically. Get full information on Swartwout's line, perfected through 25 years of building high quality roof ventilators—the Airjector, the Rotary, the Swartwout-Dexter Heat Valve. Write today.

THE SWARTWOUT COMPANY  
18615 Euclid Ave. Cleveland, Ohio

**Swartwout**  
VENTILATION SPECIALISTS

### Heating a Church with a Zone System

(Continued from page 45)  
zone, but the other zones are completely shut off. This means that if only one zone is in use the full capacity of the blower is used in that zone (not considering resistance); also the full heat capacity of the furnace is used in one zone and quick temperature rise takes place.

Of course the capacities of the furnace and the blower are such that quick heating can also be obtained for the entire building.

#### Burner Control

In the bonnet of the furnace there are three air stats. These are set at 150 deg., 165 deg., 180 deg. When bonnet temperature is 150 deg. all three gas burners are operating. At 165 deg. only two burners operate; at 180 deg. only one burner operates. By this arrangement heat output is roughly synchronized with the heat demand and if only one zone is in use, the furnace can coast along on one or two burners, depending on outside temperature. The arrangement of the burners is shown in a detail sketch.

There is also a high temperature limit control in the bonnet which shuts off all burners (fan continues) at 225 deg.

The specifications called for 70 deg. at zero out-



### Install **COLE'S FLOOR FURNACE**

Here is the floor furnace that burns natural, artificial or mixed gas with greatest economy and efficiency . . . Cole's Gas Fired Floor Furnaces are equipped with the patented burner whose automatic air intake requires no air adjustments.

The inner heating unit of the Cole Floor Furnace is of full vitreous porcelain enamel. Three walled galvanized steel casing. Full porcelain casing at small extra cost.

Large heating surface and long delayed flue travel get maximum efficiency from fuel. Unit crimped and sealed by special Cole process insuring gas-tight and stay-tight construction.

Combination safety pilot and automatic thermostatic heat control available for all Cole Floor Furnaces in the 20-30-40 series.

Write for full details today.

**COLE HOT BLAST MANUFACTURING CO.**  
5108 West 51st St. Chicago, Ill.

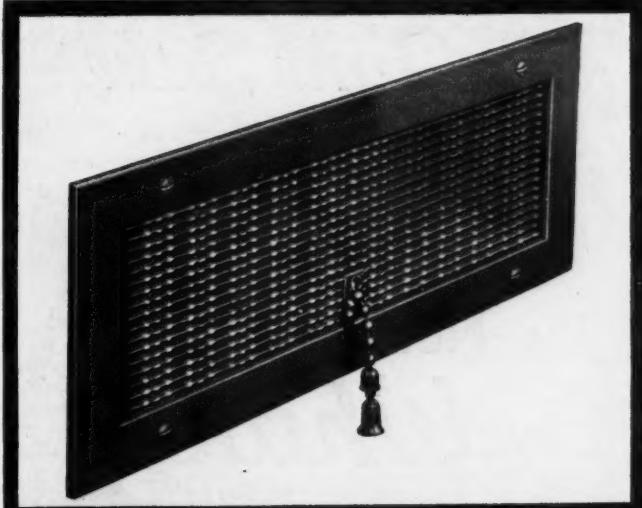
doors. During severe weather last winter 70 degrees was obtained in every room, but of more interest there was only 1 to 2 deg. difference between front and back of auditorium and 70 or over along the floor. No temperatures were taken at the ceiling.

The three stages of heat input, plus zoning and the control of return air as well as supply air, gives this system a flexibility very pleasing to the membership. Although this church is well known for its many social activities with "something going on" practically every day, the system in severe weather last winter met all demands without giving any trouble.

During the summer the ventilation system has been used with good success, chiefly due to the fact that one zone can be opened and the full capacity of the blower used to change the air in that zone quickly.

#### 229—Oil Heat Air Conditioner

The Rudy Furnace Company, Dowagiac, Michigan, is distributing an 8-page catalog covering the Rudy Oil Heat Air Conditioner. Three models are pictured—the Rudy 80 with 85,000, the Rudy 125 with 120,000 and the Rudy 200 with 190,000 Btu output capacity. Construction of the heating, humidifying, circulating and filtering elements, the floating flame combustion principle, the Rudy loop system of installation, and the controls, are all illustrated and described, followed by specifications.



LOW COST  
WARM AIR  
REGISTERS  
WITH  
**uni-fin**  
FEATURES

BARBER-COLMAN COMPANY  
ROCKFORD • ILLINOIS

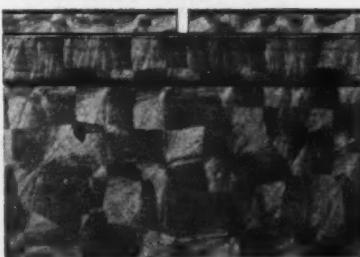
**uni-fin**  
GRILLS and REGISTERS

For beauty, for durability, and—most important but usually least appreciated—for a thoroughly diffused flow of air with minimum drafts and maximum uniformity of distribution, use UNI-FIN on new or replacement forced warm air heating jobs. Complete data on request.

## AN EXCLUSIVE Snap-Rite FEATURE



Here is the Gray "Snap-Rite" method of branch takeoff installation, employing the exclusive "pre-notch" feature.



The first illustration shows rear view of pipe cleat as trunk pipe and elbows are shipped from the factory. Pre-notching is done at 4", 6" and 8" points from both sides.



The second illustration is a front view of the cleat. To install simply cut out the metal left above the cleat. Does not require bending the cleat back and does not distort pipe.

The third illustration shows the completed takeoff installation. With no notching on either takeoff or trunk pipe both snap firmly into place making a neat, air-tight connection.

## "PRE-NOTCH" SAVES TIME INSURES AIR TIGHT JOB...

Only in Gray Snap-Rite Pipe and Fittings can you get the exclusive "pre-notch" feature which eliminates all notching on trunk pipe corners and takeoffs. Notching is done at the factory to save your time and to insure an air-tight job in every installation.

To install a branch takeoff together with succeeding length of square pipe simply complete the notching by cutting out the small section of metal remaining above the cleat. Takeoff and next length of square pipe will then Snap-Rite snugly into place.

Write for complete details today.

**GRAY METAL PRODUCTS CO.  
ROCHESTER, N. Y.**

***Snap-Rite***

# AJAX

A NEW LINE OF  
**PREFABRICATED DUCTS and FITTINGS**  
for Forced Air and Air Conditioning Installations



Our Catalog "A" (Gravity Fittings), Catalog "B" (Forced Air Fittings) are yours on request.

## THE CINCINNATI SHEET METAL & ROOFING CO.

Furnace Fitting Department

230 E. Front St.

Cincinnati, Ohio

## CASH ON HAND...

will be no stranger to heating men who go after the wide-open gravity heating field. There's plenty of profit in a gravity job and indications are that the majority of new homes will be heated with Gravity units.

The time to start is RIGHT NOW and the right gravity furnace is the time-tested "VERNOIS" to assure the customer efficient, economical heat, and yourself no troublesome call-backs. Literature is yours for the asking.



QUALITY  
•  
EFFICIENCY  
•  
CORRECT  
PRICE  
•  
Write Today

Mt. Vernon  
Furnace &  
Mfg. Co.  
MT. VERNON  
ILLINOIS

## Fall and Winter Volume

(Continued from page 37)

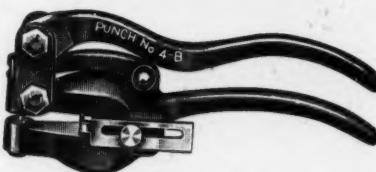
replacement work, now under way, have seemed successful and the same ideas are due to be launched in numerous cities shortly. For example, the Washington Letter of June, 1940 tells about the Baltimore project.

Terms of purchase and time payments have never been easier. Whether it is a new roof, new drainage system, furnace, winter air conditioning system or small repair, the owner can have up to three years to pay under a financing plan which has quickly received universal acceptance and understanding.

Our national income has been increasing year by year. A 70 billion national income is forecast for 1940. This means that there should be several billions more in wages to be spent this year than there was last. If our industry had a good year in old house work in 1939, this year should be excellent.

So, all things considered, the coming fall and winter seasons should be active for practically every type of contractor following all lines of work within our industry.

## A REAL *Time Saver*



## The No. 4B PUNCH

by *Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of  $\frac{1}{4}$ " through 16 ga., weighs 3 pounds,  $8\frac{1}{2}$ " in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.



W.A.  
**WHITNEY MFG. CO.**  
636 RACE ST. ROCKFORD, ILL.

## Kruckman's Washington Letter

(Continued from page 38)

The Major is head of a Committee formally known as the Advisory Branch of the Office of the Construction Division; informally it is called the Blossom Committee because one of its most active members is a civilian employee, Francis Blossom, known widely in the building industry. The other member is Harry Dresser. This Committee passes upon the qualifications of those who negotiate for contracts and, in effect, has almost the last word in choosing those who get the job.

### Fixed-Fee Job Direction

In the larger transactions, the cost, plus-a-fixed fee negotiation, the Government has its own architects and engineers, and the general contractor makes subcontracts, also on cost, plus-a-fixed-fee basis, approved by the Government. The job itself, of course, is constantly under the supervision of officers of the Construction Division of the Quartermaster Corps. In the lumped-sum transactions, the general contractor virtually takes over responsibility for all parts of the work, including engineering, architectural planning, and subcontracts. This comes under the more direct supervision of Maj. V. D. Violante, in the Construction Division of the Quartermaster General's Office, and under civilian advisor, H. W. Loving, also in the Construction Division, who may be found in Room 2241, Munitions Building, Washington, D. C.

Those who live within reach of any of the following cities, will find Quartermaster officers at the various local headquarters who will readily give lists of future jobs, and discuss essential details: Atlanta, Boston, Brooklyn, Chicago, Philadelphia, St. Louis, San Francisco, San Antonio (Ft. Sam Houston, Tex.), and Jeffersonville, Ind. Find the address in the local directories under the listing Army

## Don't forget IRONSET on your next furnace job!



No furnace can be more efficient than its joints—**THAN THE FURNACE CEMENT YOU USE!** Furnace cement costs are so insignificant when compared with the original cost of a furnace and its installation that only the best furnace cement should be used. Don't buy furnace cement carelessly, for with the "Pennies" spent for furnace cement you can make or break a job, can establish or kill a reputation, build or ruin your business. Try Ironset on your next furnace job. This BETTER cement guarantees a gas-tight seal when setting new furnaces or resetting old units. Ironset withstands higher temperatures, can be fired immediately, can even be applied to hot metal... **WILL NOT CRACK, BLOAT, SHRINK, OR BLISTER!**



Stocked by leading jobbers and hardware dealers in 1, 5, and 10 lb. cans, also 50 and 100 lb. drums. Write for free bulletin.

**FIRELINE STOVE & FURNACE LINING CO.**  
1814 N. Kingsbury St. Chicago, U.S.A.

We Use **CLARAGE**  
**FANS** because Every  
Wheel is BOTH **Statically**  
and **Dynamically Balanced**

At left — complete fan for forced air heating or year-round conditioning. Very compact. Built in 10 sizes.

TRY

Or wheels only in any of 10 sizes to give any desired volume and pressure.

### these QUIET-RUNNING UNITS

Standardize on Clarage—and protect your jobs against "fan troubles." Perfectly balanced wheels, improved bearings and slow operating speeds insure **QUIETNESS**—guarantees long service. Most widely used equipment in your field. Write for Bulletin 33 and see why!

**CLARAGE FAN COMPANY**, KALAMAZOO, MICH.  
Engineering offices in all principal cities

COMPLETE AIR CONDITIONING  
COOLING  
VENTILATION  
FACTORY HEATING  
MECHANICAL DRAFT  
**FANS AND BLOWERS FOR INDUSTRIAL NEEDS**

## UNFAILING ACTION under all conditions

When you consider temperature controls for your heating units or air conditioning installations, there are certain things you will not want. You won't want a control that may leak. Nor one that may weaken with time, or at unexpected high temperatures.

What you do want is dependable, unvaried action at all times; and that you get from those foremost controls which are actuated by Chace High Temperature Thermostatic Bimetal.

Even at excessive temperatures the action of extra-strength Chace Bimetals is exact and uniformly reliable. There is nothing about them to leak or weaken. Year after year their movement remains the same.

For definite assurance of unfailing, uniform action, at the precise temperature at which control is set, be sure to get those dependable controls in which Chace Bimetal is used.

### Specify Chace

Control manufacturers are invited to consult us for type of Chace Thermostatic Bimetal best suited to meet specific demands.

**W.M.CHACE CO.**  
1601 BEARD AVENUE  
DETROIT, MICHIGAN

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*Dependable!  
Easy-Selling!  
Profitable!*

## HOME COMFORT

STEEL  
Air Conditioning  
FURNACE

•  
Write for  
Prices and  
Sales Rights.  
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ST. LOUIS FURNACE MFG. CO.  
2901-11 ELLIOTT AVE.

ST. LOUIS, MO.

*Heat-Treat, Temper, Anneal or  
Case-Harden Most Economically*

### JOHNSON No. 502 BENCH FURNACE

Gives You 1800°  
F. without a  
Blower

Heats soldering  
coppers up to 12  
lbs. a pair. Unex-  
celled for heat-  
treating, tempering,  
annealing or case-hardening carbon steel tools or small metal  
parts. Operates at top efficiency at lowest cost. Equipped  
with 2 Johnson Burners, shut off valve and pilot light. Johnson  
patented curved-shaped hood forced return blast over parts  
being treated. Base and hood heavily lined with refractory.  
Baffle plate and work rest block included.



#### Use Low-Cost Johnson Soldering Fluid

Can be used on all metals and their alloys except aluminum. Will not  
vaporize under high temperature, nor will it evaporate or deteriorate.  
Inexpensive, because so little is sufficient for general work.

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JOHNSON GAS APPLIANCE CO.  
Cedar Rapids IOWA

519 E Ave. N. W.      Established 1901

Quartermaster Procurement Planning District. Each office acts for a group of States. If the nearest point is not the headquarters for your area the officers in charge will tell you where to go.

#### Army Favors General Contractor Over-All Contract

As a general thing, the Army people honestly seem to feel that every interest will be best served by making the general contractor responsible for the over-all contract. They feel that under the present emergency conditions, the relation of the general contractor to the Government is less that of a contractor than that of an agent employed to handle a specific over-all job. The Army point of view is that the general contractor is engaged to provide everything on a purchase and hire basis. In effect, the general contractor, or agent, or management corporation, then proceeds to do business with subcontractors on the basis of hiring services and buying equipment and materials on a firm price basis, if that is feasible.

Recently the Judge Advocate General of the Army caused to be drafted a form covering the Cost, Plus-a-Fixed-Fee Contract, formally known as C. P. F. F. Form No. 1. In its mimeographed form it covers 21 pages. Later a briefer document was drafted to cover the Cost, Plus-a-Fixed-Fee Construction Subcontract. It covers 7 pages. Copies undoubtedly may be inspected at the local offices of the Quartermaster Officers.

#### Navy Favors Direct Sub Contractors

The Navy, of course, works under the same law that governs Army operations. But it is curious that the Navy people seem to definitely favor the small contractor and are inclined to give the subcontractor the breaks. Where it is possible, in Navy building jobs, the work is parcelled out directly to those who furnish the services and equipment and the installation. It is only proper to note, however, that in most instances it is necessary to conform to the over-all general contractor method.

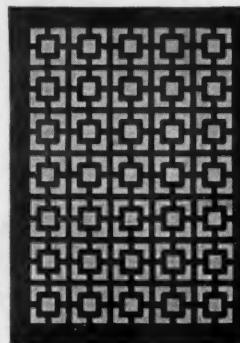
Building for the Navy is negotiated and supervised by

## PERFORATED METALS

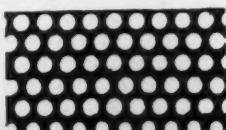
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.

Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7".  
Slot holes from .008" to 3" wide.  
Square holes of standard sizes.  
Complete line of brass and tin in small sizes. Prompt Service—Pleasing Prices.



Send us  
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specifica-  
tions.



(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

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PERFORATING

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the Paymaster General who is head of the Bureau of Accounts and Supplies which heads up in Washington, D. C. The present Paymaster General is Admiral Ray Spear. If you wish to furnish either services or sell equipment or materials in building operations to the Navy, it is wise to be placed on the list of those who are qualified.

#### How Contractors Become Qualified

A general contractor or subcontractor is qualified after his credentials are checked. When his name is placed on the list he receives regularly by mail or otherwise notification of the various jobs that are needed by the Navy. There is no particular difficulty for any reputable contractor or subcontractor to have his name placed on the list and it is suggested that if you wish to be listed you write to Commander W. B. Young, Bureau of Supplies and Accounts, Navy Department, Washington, D. C. When you write, ask the Commander to send you also a copy of the pamphlet, "Selling to the Navy," a reprint of a booklet originally published in 1919, which will be published again early in September. The booklet has much detailed information about methods of doing business with the Navy.

It also is interesting to note that when you are listed as a qualified contractor or subcontractor you will receive word about local jobs under the jurisdiction of the Bureau of Yards and Docks which is in charge of Maintenance and Repair. Your name is automatically listed with the 23 division offices scattered in as many different localities throughout the United States.

#### The Little Known Munitions Board

The Army and Navy interlock in the organization known as the Army-Navy Munitions Board. This powerful unit in current defense preparations, even superior in authority and prestige to the Knudsen-Stettinius National Defense Advisory Committee, works in close liaison with the so

## PENNIES SAVED are DOLLARS EARNED

### STANDARD E-Z-ON



There is a definite saving for you in either of the E-Z-ON damper regulators.

### SNAP-TITE E-Z-ON



The standard E-Z-ON which, during the past year, has won national acceptance . . . The New SNAP-TITE E-Z-ON which is rapidly coming to the fore as the perfected snap end bearing regulator will effect definite savings for you in application costs and in the fact that through their simplicity you can delegate the important job of damper assembly to your youngest apprentice.

#### ASK THE MAN WHO USES E-Z-ON

Contractors: If you have not already tried E-Z-ON send us the name of your jobber and receive FREE your sets of regulators.

**M. A. GERETT CORP.**  
2945 N. 30th Street — Milwaukee, Wisconsin

## EASY TO CARRY, EASY TO USE!

### Premier Furnace Cleaner

The new Premier Furnace Cleaner saves valuable time by speedy performance and easy portability—saves money by its rugged, trouble-free construction. One man can carry and operate it—and it's built for long and profitable years of service. Cleans either cold or under fire and the cleaner can be used independently from the container for suction and blowing jobs.



#### New Improved Model— Completely Equipped

**5/8 Horsepower \$950**  
**1 Horsepower \$8950**

Complete Chimney Cleaning Equipment  
Only \$9.00

**ELECTRIC VACUUM CLEANER CO., INC.**

1734 Ivanhoe Road

Cleveland, Ohio

### QUALITY FURNACE TOOLS

#### A COMPLETE LINE FOR EVERY NEED

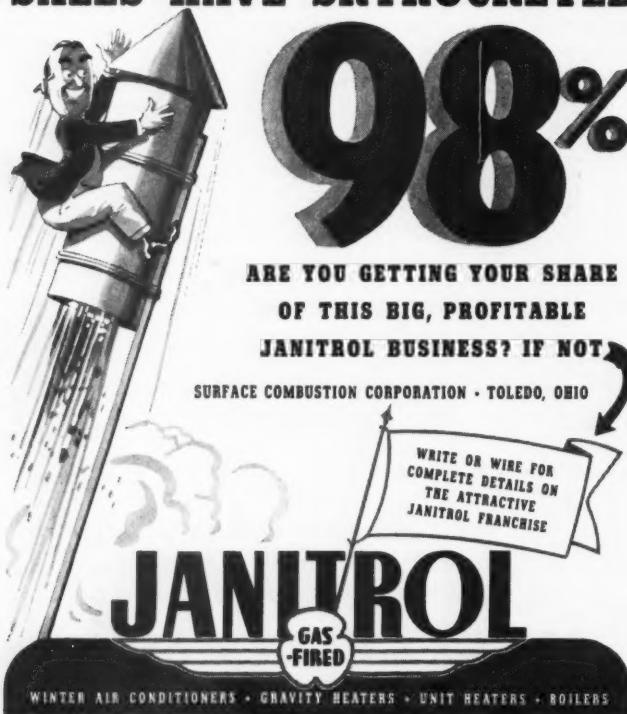
Sturdily constructed, Farrell-Cheek Tools are built to give years of severe usage, and designed to meet practical service requirements. They are efficient, easy to handle and very rigid to withstand abuse. All tools are constructed of durable cast steel with welded pipe couplings.

WRITE TODAY FOR CATALOG AND PRICES

**FARRELL-CHEEK STEEL CO.** SANDUSKY, OHIO

# JANITROL

## 1940 WINTER AIR CONDITIONER SALES HAVE SKYROCKETED



### TRIANGLE Shock Absorbing PILLOW BLOCK

(Patent Pending)

New Type Silent Bearing for Blower Service

Unique engineering encloses bushing, cushion and oil reservoir in pressed steel ball, making compact unit streamlined to present minimum of air restriction. Built-in, oil-proof, synthetic rubber cushion absorbs vibration. Porous bronze bushing, wick-fed from large oil chamber insures lubrication for exceptionally long periods of operation. Positively self-aligning due to ball and socket action of spherical housing and mounting.

Results! Low cost, increased air delivery, utmost durability and freedom from vibration. Quotations submitted on request.

TRIANGLE MFG. CO., 395 Division St., Oshkosh, Wis.

called Hogan Committee. The Hogan Committee has as members E. H. Harding, general manager of the Associated General Contractors of America; E. P. Palmer, emeritus president of the AGC; and representatives of the Construction League of America, American Institute of Architects, American Engineering Council, and American Society of Civil Engineers. This Committee submits the names of at least three persons or corporations qualified for specified building contracts and the Army or Navy chooses one or all of them for the job.

### Hay Fever Relief

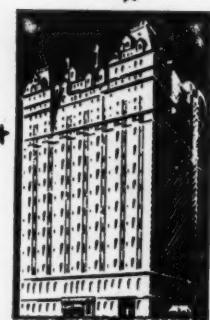
(Continued from page 41)

filters of group "A" are most suitable for the purposes at hand. These filters are in the medium price range, have a very low resistance, and have the excellent quality of holding large quantities of pollen or dust without permitting any to pass through. This permits the use of a single type "A" filter throughout an entire season.

Filters of groups "B" and "D" are not recommended because their filtering action depends on the adhesive. These types do not provide sufficient holding (adherence) properties for continuous satisfactory operation. Also the general construction of these filters is such that vibration will cause pollen or dust to sift through.

The filters of group "E" are as good as those of group "A" as to efficiency and retentive qualities but they have two undesirable properties. First, they offer high resistance to air flow and second, the patient may be allergic to the material.

[To Be Continued]



One of the  
Few Famous  
Hotels in

## AMERICA

When important events come to Philadelphia, you'll find them at the Bellevue. The Republican National Committee had its headquarters here, of course. So did the Democratic National Committee four years ago. It is where things happen, and outstanding people stay. It is the meeting place of people who do things in business, art and social life.

**BELLEVUE**  
**STRATFORD**  
IN PHILADELPHIA

CLAUDE H. BENNETT, General Manager

## Evaluation of Spray Operator Ability

(Continued from page 67)

Ps = per cent by weight of non-volatiles in finishing material

W = weight per gallon of finishing material in pounds

For example, an operator uses 0.6 gallons of material (Va) in spraying 40 pieces per hour (N). The area per piece is 1.5 square feet (A) and the cured film thickness measures 0.00120 inches (Tc). The material weighs 6.5 pounds per gallon (W), contains 35.0% by weight of non-volatiles (Ps) and cures to a film whose density is 1.65 grams per cubic centimeter (Dc). The material utilization factor is, therefore:

$$(519) (1.5) (0.00120) (1.65) (40) \\ \text{Mu} = \frac{}{(35.0) (6.5) (0.6)} = 0.45$$

Had there been no waste of material this factor would have been unity and the production greater in the ratio of 10 to 4.5.

### Productivity Factor

From the previous discussion it will be seen that the overall productivity of a spray operator is a function of both his labor and material util-

## VIKING-Easiest to Sell!

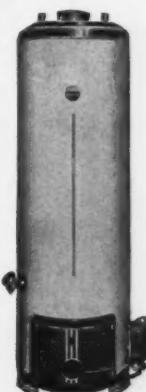
Specially built  
for the SMALLER  
CAPACITY FIELD



Utility room  
model, requires  
floor space only  
26" x 33".

### Complete Line of OIL BURNING FURNACES

Viking is the "big hit" in the smaller capacity field. And no wonder! A complete line of Winter Air-Conditioning units designed from start to finish to meet heating needs of modern small-cost homes requiring furnaces rated at 55,000 to 100,000 B.T.U.'s. Amazingly efficient, low-cost operation. Eight beautifully designed, compact units. Priced to sell in volume! Write for furnace catalog.



### OIL BURNING WATER HEATERS

Low priced but quality built—and they always work! Famous for trouble-free operation. Completely automatic models as low as \$75.00 retail, installed. 20 to 45 gallons capacity. Breese burner equipped, door-mounted and shelf-mounted types. Modern styling, beautiful finishes. Write for catalog.

### VIKING MFG. CORPORATION

12602 Greenfield Ave., Detroit, Michigan

**MARSHALLTOWN**

Here's just the Shear  
for your shop—it's a  
PROFITABLE, inexpen-  
sive, hand-operated  
tool. Does hundreds of  
odd shearing jobs bet-  
ter and faster.  
Quickly CUTS ANY  
SHAPE in 18 gauge or  
lighter material.

**THROATLESS  
SHEARS!**

CUT ANY  
SHAPE  
ANY SIZE  
SHEET!

No. 18  
Hand  
Power

**THE most  
PROFITABLE  
TOOL IN  
THE SHOP**

Send for Shear Bulletin. Gives  
details of the Marshalltown Line.  
Sizes from 18 gauge to one-half  
inch capacity.

**MARSHALLTOWN MFG. COMPANY**  
920 E. Nevada Street      Marshalltown, Iowa

## Keep Your Best Salesman Working Full Time

And in home territory,  
only four blocks from the  
shop each four ways.  
Makes 64 blocks, with 236  
sides of furnaces. In arm's  
reach, why go far away?

Nobody barred, your very  
best salesman is Furnace  
Cleaning. In selling re-  
pairs or new plants. Plus  
stokers, conversion burners,  
oil burners, wall insula-  
tion, whatever makes  
home fires more cheerful.  
And much air condition-  
ing.



Furnace cleaning was once your job exclusively. Not so now, tho today it pays bigger profits than ever. The money on cleanings alone. Now add chimneys, too. Sell new grates, parts, repairs, new plants. MUST beat the other fellow to the prospect. Call up or call on every home within four blocks of your shop. Offer to clean the furnaces. The results will amaze you.

Then get busy with your Super. We'll send you one for five days free to prove that furnace and chimney cleaning are always your best bet. The free Plan Book tells how to make easy money selling cleanings.

### ----- USE THIS COUPON -----

The National Super Service Company  
1944 N. 13th Street, Toledo, Ohio

Send me the free Plan Book and complete information about  
your free trial and the new low-priced Super. Can I also clean  
tubular boilers? And chimneys?

Name .....

Street Address .....

City and State .....

BENDING  
BRAKES

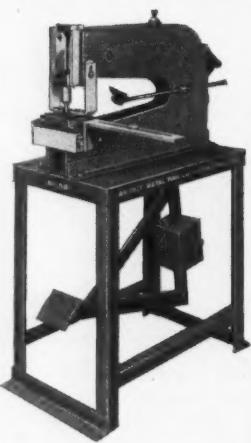
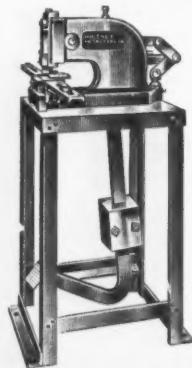
**WHITNEY-JENSEN**

METAL  
TOOLS

## FAST, CLEAN PUNCHING

AT SPEEDS OF 100 HOLES  
PER MINUTE AND BETTER  
IS EASY WITH THESE  
WHITNEY-JENSEN

## FOOT PRESSES



• Nos. 58 and 68

Capacity, 2" hole in 16 ga. iron. Stroke of ram 1", ram adjustment 3/4". Depth of throat, No. 58—18", No. 68—24". Adjustable foot treadle and counterweight.

• Nos. 28 and 29

Capacity, 2" hole in 16 ga. iron. Stroke of ram 1 1/2", ram adjustment 3/4". Depth of throat, No. 28—17", No. 29—10". Adjustable counterweight on foot treadle.

WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois

## "Williamson Line Is A Money-Maker"

"The Williamson Heater Company:

Our sales experience covers a period of 53 years during which time we have operated as distributors for many nationally known lines of various equipment and supplies. In our judgment the Williamson line of heating and winter air conditioning equipment, pre-fabricated pipe, duct and fittings, and accessories, is an outstanding money-maker for both the jobber and dealer. With it, we can take care of every central heating requirement. If, at any time, you wish to refer prospective customers to us for recommendation, please feel free to do so."

Signed—X Y Z, . . . Georgia.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

**FREE:** Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

**WILLIAMSON**  
WARM AIR FURNACES  
1890 — Golden Anniversary — 1940

ization. If this productivity be designated (P), then:

$$P = (Lu) (Mu) \dots \text{Eq. (5)}$$

or:

$$P = \frac{(Va)}{(Vp)} \times \frac{(519) (A) (Tc) (Dc) (N)}{(Ps) (W) (Va)} \text{ Eq. (6)}$$

For example, taking the conditions described in the labor and material details above, the combination would show a productivity of

$$P = (0.6) (0.45) = 0.27.$$

### Discussion

Equation (6) shows the actual ability of a spray operator in comparison with his maximum capacity. Time studies taken to set piece rates may vary for a number of reasons, but the productivity factor is a definite quantity and as such may be used as an absolute method of rating. Comparisons may be made between operators and between jobs with less chance for error and with more fairness to both employer and employee.

In addition, an examination of the labor and material factors will show where an operator is particularly efficient or not, as the case may be. If an operator shows one outstandingly high factor his example can be studied and applied to others to raise the general productivity. On the other hand, a low factor will immediately indicate where stress must be laid to eliminate losses of time or finishing material.

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## Bookkeeping By J. G. Dingle

(Continued from page 83)

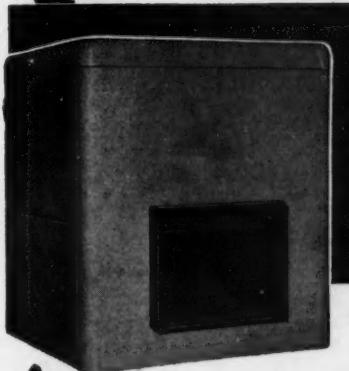
it appear that the intelligent competitor is trying to make an excessive profit.

Perhaps, it will be well for you to step across the street and look at your shop—to get a view of it as it appears to the other fellow. Before doing this, look into the details of the shop or store of some friend who is quite successful and see if you can find in your place of business those qualities which appear in the shop or business of your successful friend. You will instantly admit there are places where you really enjoy trading and again there are places where, for some reason, you should do some business, yet you can not feel comfortable in trading there.

### Do People "Like" to Trade with You?

Analyze these different stores and you will soon find that the foundation of the one is laid in the desire to appear successful, the aim to please all who enter there and to serve well all who place their business there. The other places will appear to be indifferent; they expect people to trade with them, regardless of the service rendered and in the end they will be sadly disappointed. No one likes to trade with a grouch.

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light duty assemblies.

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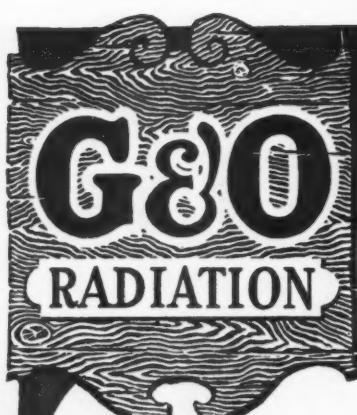
ROCK ISLAND REGISTER CO.  
Rock Island, Ill.

Mail me a copy of your new catalogue and dealer's net estimating book.

Name .....

Street Address .....

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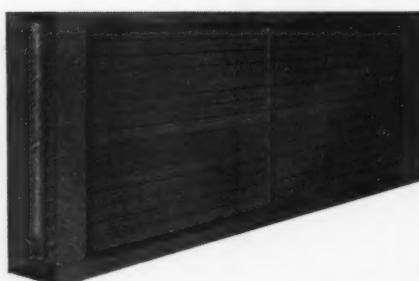


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The only valve with the accessible orifice.

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VIKING

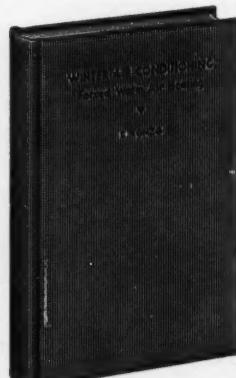
AIR CONDITIONING CORP.

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Nothing succeeds like success and the best recipe for success is to be successful. Admit it in everything you do. Show your pleasure in serving your customers; express your appreciation to your employees for helping you to success and you will find that when it is all added up, you have become a real success—not only in the monetary return, but in the satisfaction of having filled your particular job well.

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favorably to the opportunity to assume the responsibility.

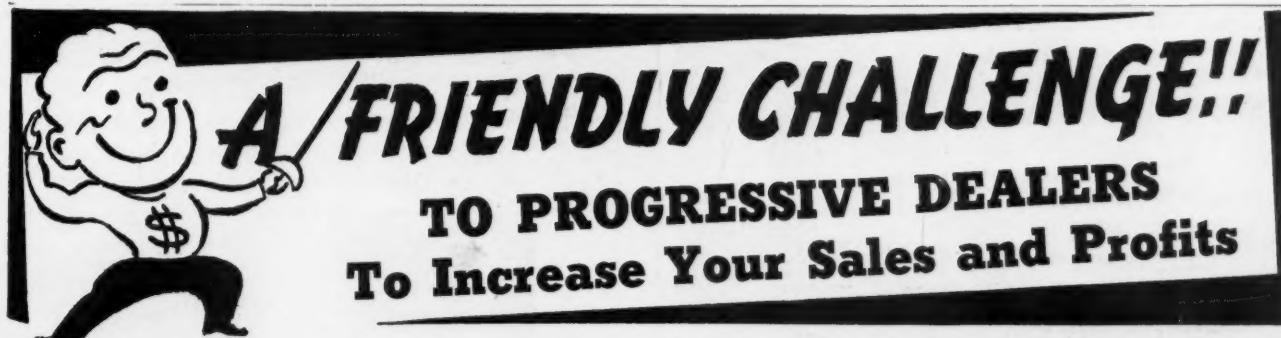
We would appreciate hearing from ARTISAN readers as to their reaction on the suggestions contained in this article. Write us your views and your experiences in putting responsibility upon your bookkeeper to represent you when you are out of the shop, or in answering your telephone. Perhaps you have some estimate sheets, some time cards, some material tickets, which you have found to fill the bill completely. Send us samples and we will look them over and show the best ones when we come to that part of our series dealing with the forms best suited to the use of the typical small shop.

## Chimneys For Oil Fired Heaters

(Continued from page 55)

benefit of those meticulously precise individuals who enjoy discussion, it should be noted that .0002 lb. of water vapor should be added to the .0790 value and .0004 lb. of water vapor to the .0787. This gives a total difference in the weight of air plus water vapor between 50% R. H. and 100% R. H. of .0001 lb. per cu. ft. at 40 deg. F.

[To Be Continued]



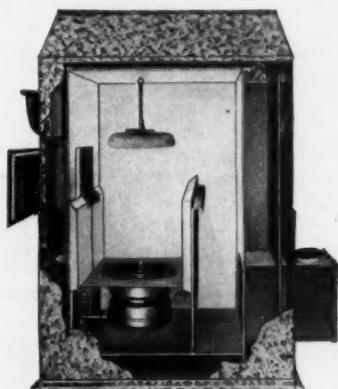
Above, the Benefactor Welded Steel Furnace for coal. Tight as a bottle with welded seams guaranteed to prevent leakage.

Our representative will call to show you how to increase sales and profits and he will also explain why HESS dealer sales for 1940 have increased almost 100% so far this year and why ...

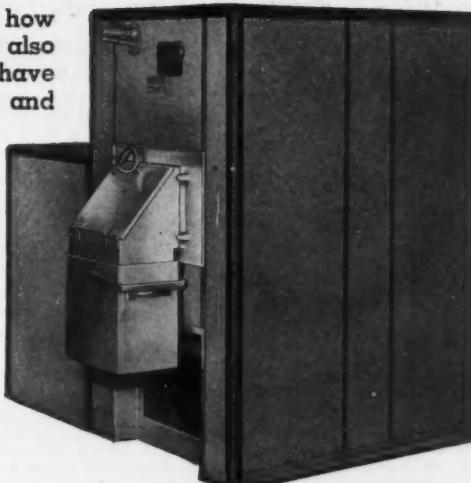
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- Prices no higher than what you'd pay for an ordinary furnace.
- Free planning service.
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Left, Benefactor Welded Steel Furnace with retort oil burner having no moving parts.



Why sell ordinary furnaces to compete with mail order concerns and others handling common types when the Hess Line gives far better sales and profit opportunities.



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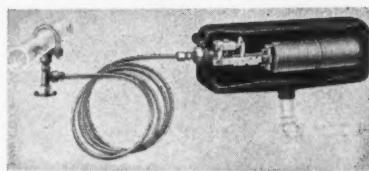
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Water Control

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## 1,000 Winter A. C. Systems Since 1938

(Continued from page 50)

prices must be increased if ducts must run through earth-floor spaces.

In a two-story home requiring long ducts to servants' quarters, often over a garage somewhat distant from the warm air plant, this, obviously, calls for higher cost than for the house cubical or square with trunk ducts comparatively short.

### Sheet Metal Specialties

It is also interesting to learn that this air conditioning contractor often has "fill-in" work in his shop in winter. This involves the fabrication of window and door sill base flashing "boxes" for use with casement types of windows and doors. Just recently Jowein produced an order for 5,000 such flashing boxes for a local building supply dealer. The latter retails them to building con-

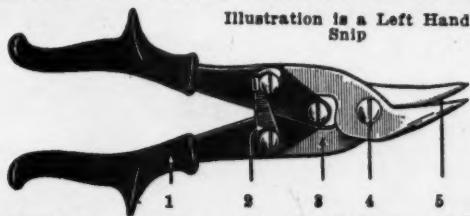


Door and window sill flashing boxes of galvanized steel are fabricated in slack times. One order was for 5,000 units. A building supply dealer buys these for resale.

tractors. Additional activities of Jowein include stainless steel hoods, ducts and trim for outfitting highway grills, restaurants, lunch wagons and other such establishments now making their appearance in astounding numbers along arterial highways. Although general architectural sheet metal work no longer is popular with this contractor, miscellaneous general work such as factory tanks, blower ducts, dust collectors and sundry other related demands reaches this shop in important volume of business.

## KLENK'S Double Action Aviation Snips

Illustration is a Left Hand Snip



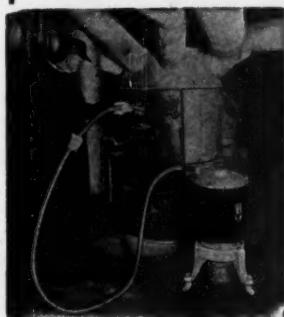
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of the important  
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TO CHECK AIR VELOCITIES WITH THE

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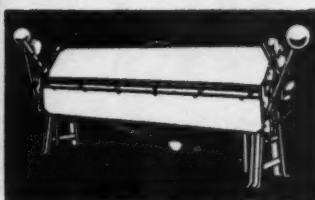
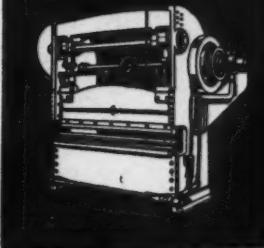


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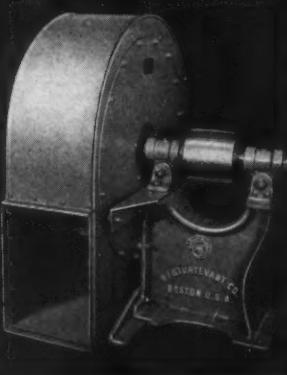


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**AMERICAN ARTISAN**  
6 North Michigan Ave. Chicago, Ill.

**Neubecker Pattern  
For Offset Fitting**

(Continued from page 53)

any vertical line as  $a'-b'$  drawn at right angles to  $F-G$ , at 4-10.

Now take a tracing of  $a-b$  in true elevation with the various intersections on same and place it as shown by  $a'-b'$  in front elevation, being careful to have the intersection 4-10 on  $a-b$  in true elevation come directly over 4-10 on  $a'-b'$  in front elevation, all as shown. From the various intersections 1 to 7 on  $a'-b'$  draw lines parallel to  $F-G$  or at right angles to  $a'-b'$  and intersect them by perpendicular lines erected from similar numbered intersections in the elliptical outline in plan and in this manner obtain the points of intersections 1 to 12 in front elevation, through which the elliptical outline is drawn, as shown.  $F-G-5-12$  then represents the front elevation of the transition.

**Side Elevation Procedure**

The same principles are employed in drawing the side elevation. Draw any line as  $1^x-D^y$  at right angles to  $4^o-10^o$  in plan. From points  $1^o-C$  and  $7^o$  in plan erect lines parallel to  $4^o-10^o$  to intersect the line  $1^x-D^y$  at  $1^x-C^y$  and  $7^x$ . In a similar manner from the center point  $B$  of the round outlet in plan, at right angles to  $1^x-D^y$  erect a line indefinitely to intersect the base line  $1^x-D^y$  at  $D^y$  and make the distance  $D^y-E^y$  equal to  $D^o-E^o$  in the true elevation.

Draw the heavy dotted line from  $E^y$  to  $C^y$  in side elevation, which will represent the central line on  $C-B$  in plan. From  $E^y$  draw a line parallel to  $1^x-D^y$  to intersect the line  $a^o-b^o$  drawn at right angles to  $1^x-D^y$  at 4-10.

Similar to the method shown in front elevation take a tracing of the line  $a-b$  in the true elevation with the various intersections on same and place it on the line  $a^o-b^o$  in the side elevation, being careful to have the intersection 4-10 on  $a-b$  come directly over 4-10 on  $a^o-b^o$ . Now at right angles to  $a^o-b^o$  from the various intersections between 1 and 7 draw lines and intersect them by perpendicular lines erected from similar numbered points in the elliptical outline in plan and in this manner obtain the intersections 1 to 12 in the side elevation through which the elliptical outline is drawn. Draw lines in side elevation from 8 to  $7^x$  and 2 to  $1^x$  to complete the side view of the transition.

This completes the true views of both side and front elevation and, although they are not necessary in developing the pattern shape, it enables the pattern cutter to visualize the object as shown in the architect's or engineer's blue prints.

[Part 2 will follow]

# Repair Parts

FOR ALL HEATING UNITS

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with this NEW LOW PRICE  
Breuer's Ball Bearing

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Furnace and Boiler Vacuum Cleaner

Not only does it excel in furnace and boiler cleaning, but it puts you directly in touch with the furnace and repair needs of your customer. Not a converted household cleaner, but DESIGNED FOR THE JOB. Complete set of necessary attachments.

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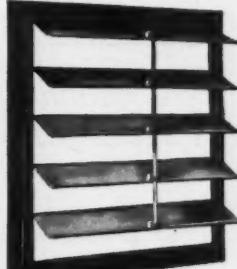
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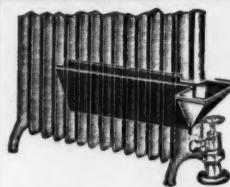
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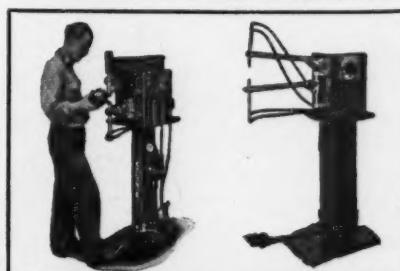
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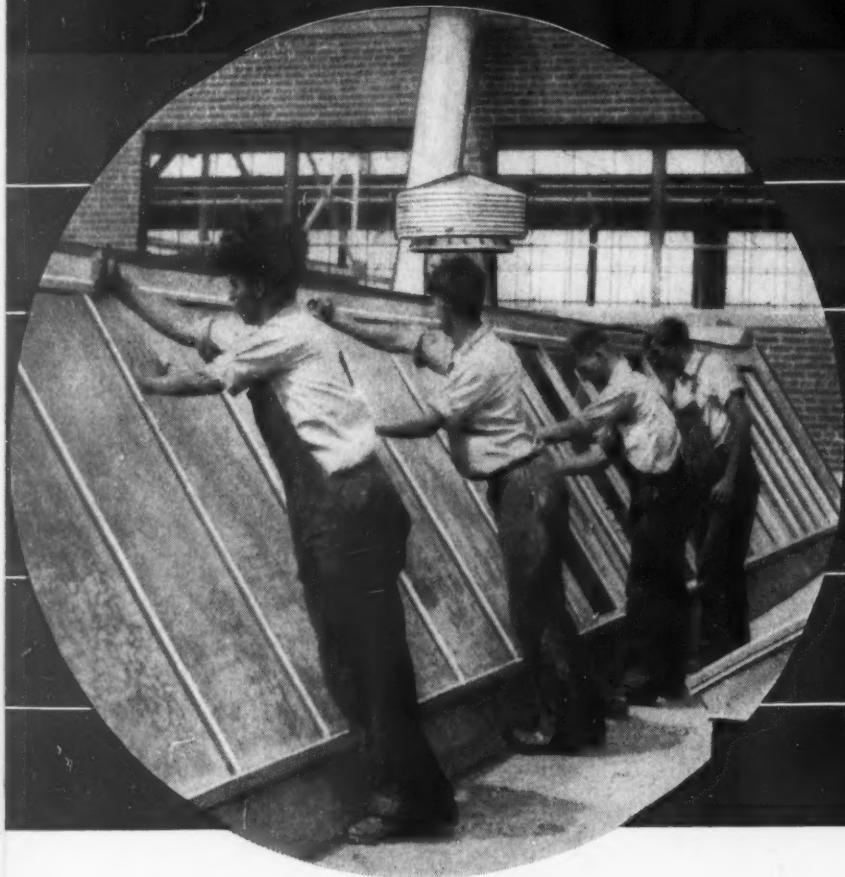
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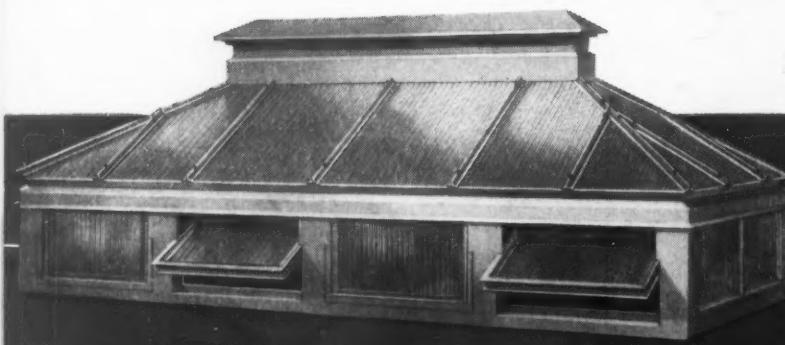
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